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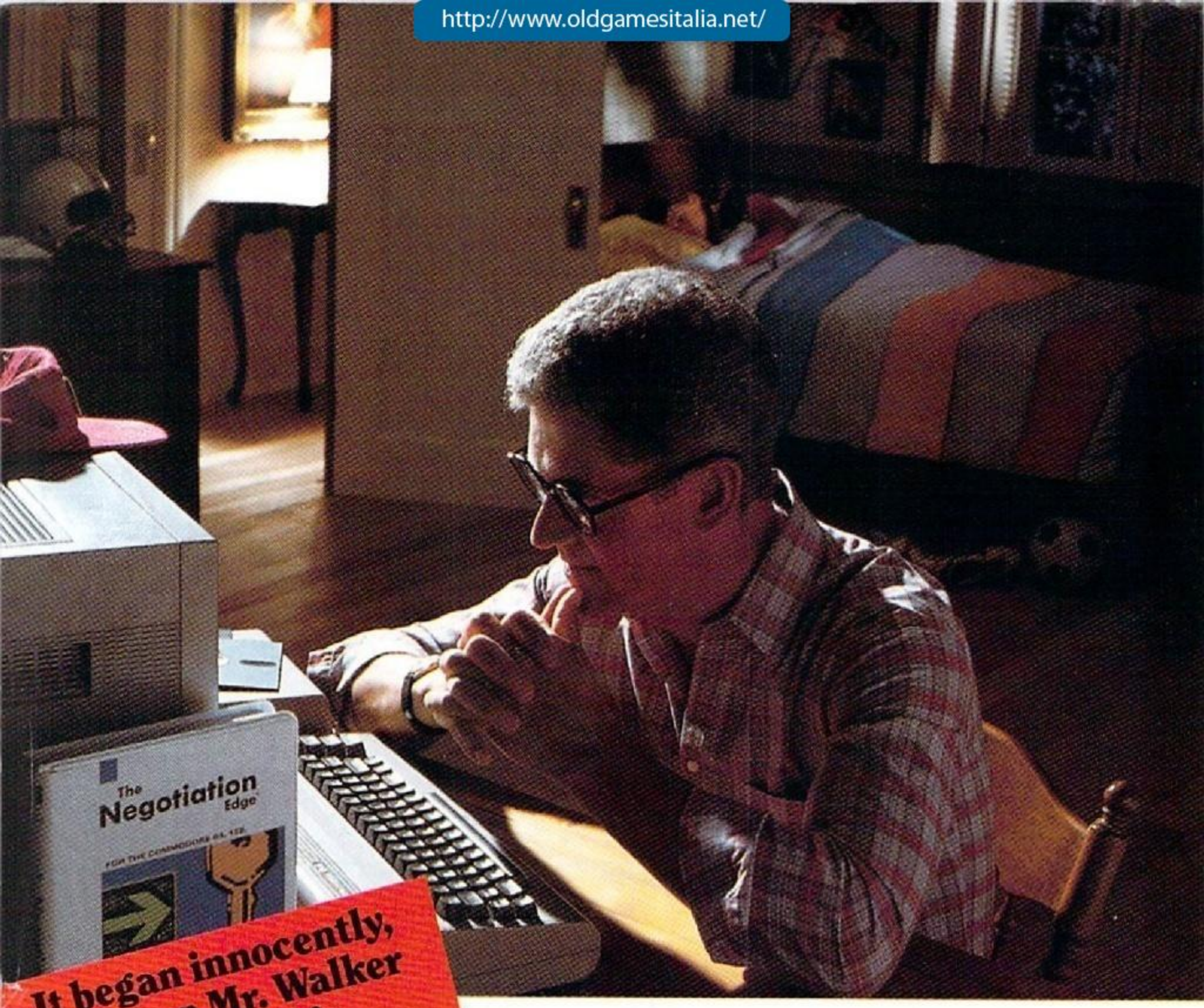

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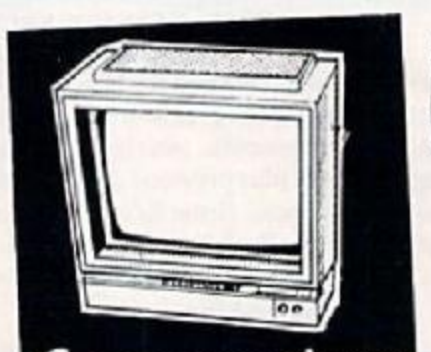

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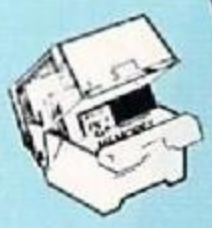

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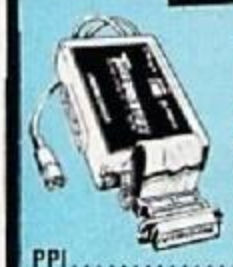

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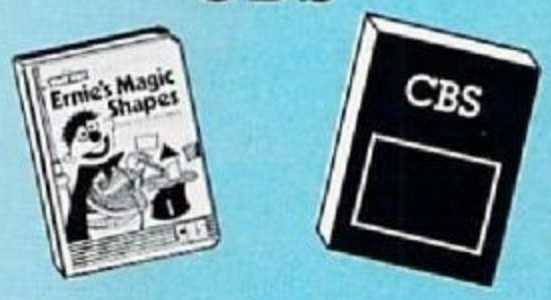

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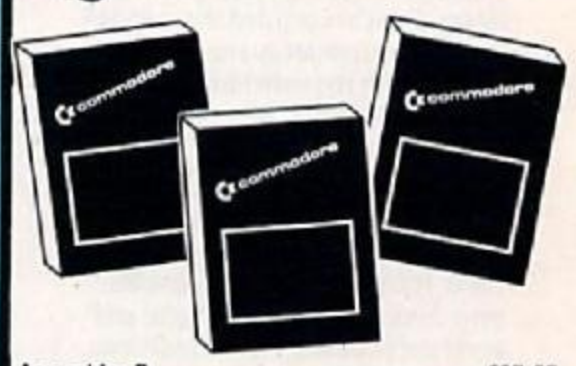

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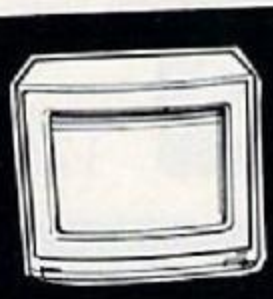

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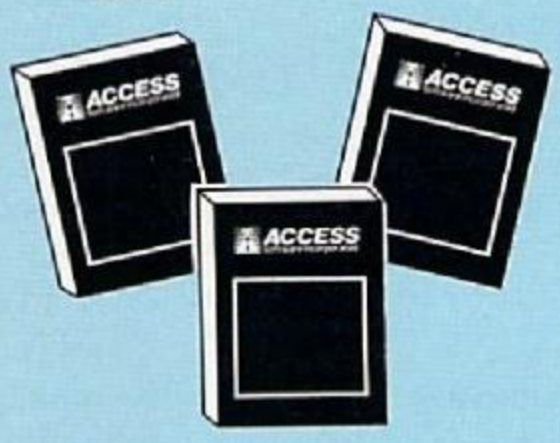

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A Shot in the Arm

We are witnessing a flurry of activity in the telecommunications field that marks an exciting spread of interest in this dimension of home computing.

Sure, telecommunications capability has been around for several years, but it has only recently reached the point where it is the fastest-growing application for home computers. Each day, hundreds of computer users are discovering the world of telecommunications, and major companies are counting on this spark of excitement to ignite renewed interest in the home-computer market.

The competition among the various electronic information networks to service this burgeoning field is heating up, as major companies establish an on-line presence.

For example, within the past few months, we've seen such heavyweights as General Electric and Knight-Ridder enter the telecommunications field with their own on-line services—GEnie and Viewtron, respectively. Also, Commodore has severed its association with the popular CompuServe network to set up its own network with QuantumLink. And there are over a half-dozen other on-line services from which to choose.

There are several reasons why telecommunications has become such an attraction:

1. Computer users are more serious about applications; they want their machines to do more than just play games.
2. Setting up a computer system for telecommunications is relatively inexpensive. Users need only add terminal software and a modem to get on-line.
3. The information and services offered by on-line networks are varied and plentiful.
4. Electronic information services are convenient and easy to use. The services offered allow you to interact with other computer users and to access information and perform chores from the comfort of your own home.

With more computers entering the home and people discovering on-line networks, more and more services are being offered—at-home shopping and banking, trivia games, college courses, library information services, special areas of interest to programmers, musicians, artists and others, and much, much more.

For over a year now, *RUN* has kept a close watch on this growing telecommunications phenomenon. We were one of the first computer magazines to set aside space each month for the telecommunications topic, and, as we enter 1986, we will continue to be the only Commodore-specific magazine with a monthly telecommunications column.

We have also been actively involved in discussions with these electronic networks regarding the use of *RUN* material on these systems. *RUN* is currently represented on Viewtron, American Videotext Services and QuantumLink, and it is our aim that *RUN* will be represented on any and all major national networks in the near future.

As more services become available for telecommuters, the home-computer market will continue to develop and grow. We contend that telecommunications will give the industry a much-needed shot in the arm.

Also, the introduction of the C-128 will provide aid in the development of the telecommunications field. Its 80-column features, CP/M mode, capacity to handle faster baud rates and increased memory storage are all features that make the C-128 an advanced telecommunications machine.

db

Wanted: Articles on Disk

For those of you anxiously waiting to break into the big time by being published in *RUN*, here's a bit of news that will improve your chances. When you send us your article submission, make sure you include both your program and manuscript on disk. This will facilitate the preparation of your article for publication. Also include a printout of your program listing and article.

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"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."
INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."
RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."
Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."
Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."
Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

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Vizastar 128 is priced at **$119.97.** Vizawrite's price is **$79.97.** Vizastar 64 XL8 is now available for **$119.97.** We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

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MAGIC

Compiled by LOUIS F. SANDER

MAGIC is tricks, MAGIC is fun. MAGIC is doing what cannot be done.

Every month, Magic brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

Magic solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). RUN *will pay up to $50 for each trick accepted. Send your tricks to:*

MAGIC
c/o Louis F. Sander
PO Box 101011
Pittsburgh, PA 15237

If you enclose a self-addressed stamped envelope, we'll send you a Trick Writer's Guide. Readers outside the United States may omit the stamp.

This month, as usual, magician readers from around the world have favored us with an incredible variety of computorial delights, applicable to every Commodore machine. Since Magic's inception two years ago, we've printed 1024 tricks from every state in the U.S. and Australia, from every province in Canada, and from 37 other countries. There's no limit to our interest in your creations, no matter where you live. Send them in and see—fame and fortune may find you.

If you like the tricks on these pages, you'll love RUN*'s second Special Issue, available in stores right now. Along with a wealth of other material, it features 512 Magic tricks—all those we printed in 1985, plus more than 200 you've never seen before. Many of the reprinted items have been enhanced and improved, and all the tricks are organized and indexed for exceptionally easy reference.*

Commodore-128 owners will appreciate our efforts in converting some of the older tricks to work on their machines. Also, the flow of new C-128 tricks is starting to look like a river; in months to come you'll see some spectacular sorcery, 2⁷ style. But for now, no matter which machine you own, behold the wonder of Magic . . .

$290 Christmas card—Type in this program on your C-64 or C-128 right now. If Christmas hasn't come yet, run it and enjoy it. If it's December 26th or later, put the program away with the ornaments, and take a look at it next year.

```
10 REM CHRISTMAS CARD - AUTUMN BAYLES
20 POKE53281,13:POKE5328Ø,1Ø:PRINT"{SHFT CL
   R}{CRSR DN}"
30 X$="{CTRL 6}HO":Y$="{COMD 3}HO":FORT=1TO
   9:PRINTTAB(T);X$;TAB(2Ø-T);Y$:NEXT:PRINT
   TAB(T);X$
40 FORJ=11TO2Ø:PRINTTAB(2Ø-J);Y$;TAB(J);X$:
   NEXTJ
50 PRINTTAB(18);"{11 CRSR UPs}{COMD 3}MERRY
    CHRISTMAS{1Ø CRSR DNs}"
60 FORC=5TO1ØSTEP5:FORP=55754TO55768:POKEP,
   C:NEXT:FORT=1TO1ØØ:NEXT:NEXT:GOTO6Ø
```

Autumn Bayles
Nazareth, PA

$291 Zaxxon zap—If you type RED on Sega's Zaxxon when the score shows up, you will be able to fly through walls and will not be damaged by anything.

Moien Jawaid Zobairi
Riyadh, Saudi Arabia

$292 1541 Unscratch—This miraculous utility resurrects programs and datafiles that have been inadvertently scratched from the disk! As it runs, it examines the disk in the drive, displaying the name of every file in the directory, including the recently scratched ones. When it finds one of the latter, it asks if you want to unscratch it. If you do, it requests a code number for the type of file involved (SEQ, PRG, REL or USR), then performs the resurrection.

We're dealing in *very* strong magic here, and if things don't go just right, you can easily corrupt your disk. Unscratching is possible, since scratching a file merely

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Push the terrorist plot to trigger a massive earthquake in this undersea graphic adventure
QUAKE MINUS ONE
Command the super heroes in this graphic adventure
SHADOWFIRE
Defeat the evil Doomdark in this medieval graphic adventure
The LORDS OF MIDNIGHT
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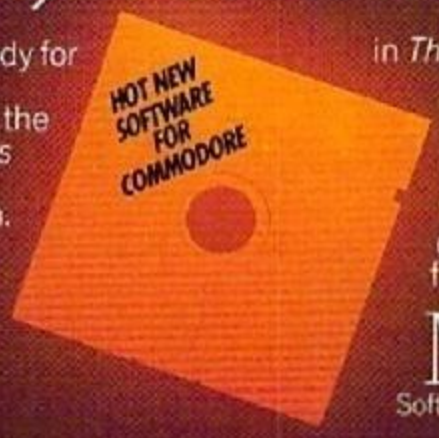

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sets a flag in the directory; the file and directory entry themselves are otherwise unchanged. Further writing to the disk, however, can overwrite any of this material, leading to unpredictable results when unscratching resets the flag. In addition, Unscratch bypasses several built-in safeguards of your disk recording system; without them, it's easy for troubles to arise.

So, please be careful when working with this program. After you type it in, test it to be certain you haven't made any disastrous errors. Save several programs on a newly formatted disk, then scratch and resurrect them one by one, until you're convinced that Unscratch is working perfectly. By the way, it's normal to experience apparently random delays of 30 seconds or so while running Unscratch—the program needs that time for "thinking."

When actually using Unscratch, it's best to use it just after your program has been scratched, before any new material has been saved to the disk. To do otherwise is to invite corruption (though sometimes it's a risk worth taking). And since the names of scratched files can duplicate those of live ones, you must be extremely careful in choosing the file to unscratch. The safest procedure is this:

- Make a backup copy of the disk you want to work with, then set it aside.
- Unscratch the file from the original disk, then load it and check to see that it's really the one you want.
- Save the file onto the disk you set aside.

If you type the program correctly and use it with caution, Unscratch can be your closest friend in times of real distress. Use it wisely and well, and remember where you got it.

```
10Ø PRINT"{SHFT CLR}UNSCRATCH - LUKE MESTER

11Ø DIMBL$(255):TR=18:SE=1:OPEN2,8,15:OPEN1
    ,8,2,"#"
12Ø PRINT#2,"U1:2,"8,TR,SE:FORP=ØTO255:GET#
    1,BL$(P):NEXTP
13Ø NT=ASC(BL$(Ø)+CHR$(Ø)):NS=ASC(BL$(1)+CH
    R$(Ø)):NM=1:FORFI=2TO255STEP32
14Ø FORPN=3TO18:IFBL$(FI+PN)=""THEN19Ø
15Ø FORPN=3TO18:PRINTBL$(FI+PN);:NEXT:PRINT
    :IFASC(BL$(FI)+CHR$(Ø))<>ØTHEN19Ø
16Ø INPUT"UNSCRATCH{3 SPACEs}N{3 CRSR LFs}"
    ;Q$:IFLEFT$(Q$,1)="N"THEN19Ø
17Ø NM=Ø:PRINT"FILE TYPES: 1=SEQ{2 SPACEs}2
    =PRG{2 SPACEs}3=USR{2 SPACEs}4=REL"
18Ø INPUT"FILE TYPE{3 SPACEs}2{3 CRSR LFs}"
    ;TY:BL$(FI)=CHR$(TY+128):IFTY>4ORTY<1TH
    EN18Ø
19Ø NEXTFI:IFNM=1THEN21Ø
2ØØ FORP=ØTO255:PRINT#2,"B-P:"2,P:PRINT#1,B
    L$(P);:NEXTP:PRINT#2,"U2:2,"Ø,TR,SE
21Ø IFNT=ØANDNS=255THEN23Ø
22Ø TR=NT:SE=NS:GOTO12Ø
23Ø CLOSE1:PRINT#2,"VØ":CLOSE2:END
```

Luke Mester
Colliers, WV

$293 C-128 bell—You can ring the bell on your C-128 by executing

```
PRINT CHR$(7)
```

Doing this also resets VOL to an intermediate level, probably 7 or 8.

Louis F. Sander
Pittsburgh, PA

$294 C-128 load and run—One simple command can be used to load a C-128 program from disk and to run it automatically:

```
RUN "programname"
```

This does everything you need.

Kenneth H. Hottes
Danbury, CT

$295 C-128 joystick ports—The C-128 boasts a slick appearance, but its designers overlooked at least one small detail. The contour of the molding near the joystick ports prevents insertion of the PaperClip (C-64 version) dongle and other similar copy-protection plugs.

I solved the problem by buying a $4.95 joystick accessory at a local discount store. The accessory is a Y cable that allows you to plug two joysticks into a single port on an Atari video game. When the Y cable is plugged into the C-128, the dongle can easily be inserted into either of its female connectors.

Others have made extensions from the subminiature D connectors available at Radio Shack, but that requires knowledge of soldering and other expertise.

Harold Gath
Brownsville, PA

$296 Shifted run/stop—On most Commodore computers, when you press these keys in combination, you're prompted with "Press Play on Tape." (The computer is trying to load and run the next program on the cassette.) If you hit the keys by mistake (not an uncommon event), you can correct your error by pressing the stop key.

On the C-128, however, pressing shifted run/stop loads and runs the first program on your disk, without pausing for additional action. If you accidentally hit those keys, whatever is in memory will immediately be overwritten by the new program coming in from disk! If the overwritten program was a valuable one you had not yet saved, you'll be annoyed, to say the least.

You can guard against this disaster by placing a sequential file first on your disk. Since the computer cannot load it, it can't overwrite any programs. You can put such a file on a newly formatted disk by executing this line

```
OPEN 2,8,2,"INSURANCE,S,W" : CLOSE2
```

Another, less automatic, way of having this insurance is to leave your disk's door open.

Bruce Jaeger
St. Paul, MN

$297 C-128 MID$ feature—In C-128 mode, MID$ has a wonderful but undocumented feature: You can use it to replace characters in one string with those from another!

Continued on p. 110.

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This is the most interesting football game I have seen.
Howard Boldebuck
Lombard, IL
Police

Thank you for the great game, with printer options.
Daniel H. Antolec
Monona, WI
Police

SUPER BOWL SUNDAY is a very enjoyable game.
Charles M. Bolton
Jacksonville, Arkansas
US Air Force

Excellent game. Best sports simulation I've seen.
Richard G. Miller
Duluth, Georgia
Engineer

The game is unbelievable! A++!
Matt Ritchie
Cisco, TX
Student

Great game, very realistic.
James Antonaccio
Somers, New York
Architect

SUPERBOWL SUNDAY is the "BEST" football game I ever played.
Michael Cwirko
Monroe, NY
Student

Good games — would like good baseball game!
Scott Peterson
Vernon Hills, IL
Sales Manager

"Nice Animation!"
Kevin McGill
Spring, Texas
Student

Excellent game! Can you expand it (more plays, more teams?)
James Heironimus
Enon, Ohio
Doctor

SUPERBOWL SUNDAY is a great game.
Rick Bray
Eugene, Oregon
Clerk

Very good game.
Mike Trimarco
Franklin Park, IL

This program is fantastic!!
Chris Calkins
Seffner, FL
Computer Technician

Excellent quality — OK.
Michael Zoyrko
Neah Bay, WA
USAF

$10,000 REWARD

if you can prove that any of the testimonials shown here are not true or have been altered in any way!

Finally a good graphics, statistical football program. Would like more printer options.
John Sievila
Waukesha, WI
Photo Engraver

This game is fun to get into!
Taylor Thompson
Arlington, Texas
Student

The best game you've come up with yet.
R. Michael Lesher
Whitehall, PA
Engineer

Make a diskette for "SUPER BOWL SUNDAY" that allows me to create teams.
Rick Dakesian
Lincoln Park, MI

Great game!
Chuck Shea
Las Vegas, NV

More disks! — Coaches disk to create teams; great teams from past — not Super Bowl; college teams.
Greg Addy
Elgin, IL
Credit Approver

Very realistic, would like other sports.
N. Sideratos
Brooklyn, New York
Student

A great game.
Derek Aiello
Warminster, PA
Student

One of the very best sports games!
Jeffrey D. Malley
Philadelphia, PA
Insurance

I was wondering if you sell 1985 teams, & if you update the disk.
Rick Rosenthal
Peabody, MA
Student

Very impressive game. Good concept and implementation.
Patrick K. Moriarty
Richmond, VA
Programmer

Very realistic simulation with excellent graphics.
Jay Hertel
Sterling, Illinois
Student

These type of games are great to play with your kids (sharpens the mind).
Rod Phillips
Craig, CO
Jeweler

Your game is great, just keep on coming out with more.
Joe Yovino
Cincinnati, Ohio
Student

SUPERBOWL SUNDAY

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Compiled by SUSAN TANONA

White Lightning

B

A Graphics-Development System Based On Forth

Anyone who's done any programming in machine or assembly language can testify to the frustrations inherent in working at such a low level. Unfortunately, graphics-intensive programs on the C-64 are abysmally slow in Basic. One of the few alternatives is a high-level language called Forth, which can achieve a significant fraction of machine-language speed, while providing a much friendlier programming environment.

White Lightning, from Oasis Software, is billed as a "high-level graphics-development system," and is based on Forth. It provides many powerful tools for generating graphics and animation on the C-64 and is capable of producing impressive results.

Software created with White Lightning can be run without it and marketed without any restrictions. Also included in the package is an extended Basic called Basic Lightning, which duplicates the capabilities of White Lightning at a lower level of performance. Basic Lightning programs require that Basic Lightning be loaded before they can be run. Both disk and tape versions of White Lightning and Basic Lightning are provided in the same package.

White Lightning closely follows the standard established by the Forth Interest Group, called FIG Forth, while adding extensions for the generation of sophisticated graphics and sound. A powerful set of extensions, called Ideal (Interrupt Driven Extendable Animation Language), provides for the easy implementation of interrupt-driven programs. A program that plays theme music or scrolls a background can run independently of the program controlling the movement of the players. Timing problems are often much easier to handle if a program is interrupt-driven. Along with numerous other functions, Ideal also includes tools for manipulating software sprites (these can be up to six screens wide), plotting lines and polygons, creating windows, and putting text in a hi-res screen.

Report Card

A ***Superb!***
An exceptional program that outshines all others.

B ***Very Good.***
One of the better programs available in its category. A worthy addition to your software library.

C ***Good.***
Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.***
There are some problems with this program. There are better on the market.

E ***Poor.***
Substandard, with many problems. Should be deepsixed!

Now, for the bad news: While I didn't find any bugs in White Lightning itself, I did identify a few problems.

My biggest complaint is the lack of a source listing for the White Lightning demo. A listing of the program would be a very good tutorial, but no lines of source code are provided on the disk. The only way to see examples of code is to list the Basic Lightning demo program and translate it into White Lightning, since the demos are nearly identical. The White Lightning version simply runs faster.

I would also like to see the source listing for the Ideal commands and other extensions as well, but realize why Oasis would be reluctant to give them away. Like most Forth programmers, I dislike the kind of programming that lets you feed a function an argument and get back a result without having any idea of what happened in between.

Another indication of the company's protective attitude is the paper on which the manuals are printed. Rather than protect the disk, they've printed the manuals on paper tinted a particularly noxious shade of orange-red, which is supposed to prevent photocopying. Perhaps it would foil some copy machines, but the only real result of their effort is eyestrain for anyone who purchases the product.

I was also disappointed with the lack of an assembler, which is a normal part of almost all Forth implementations, and the very small editor. Also, besides being extremely complicated and difficult to understand, the sprite editor included in the package is written in Basic Lightning and its performance suffers as a result.

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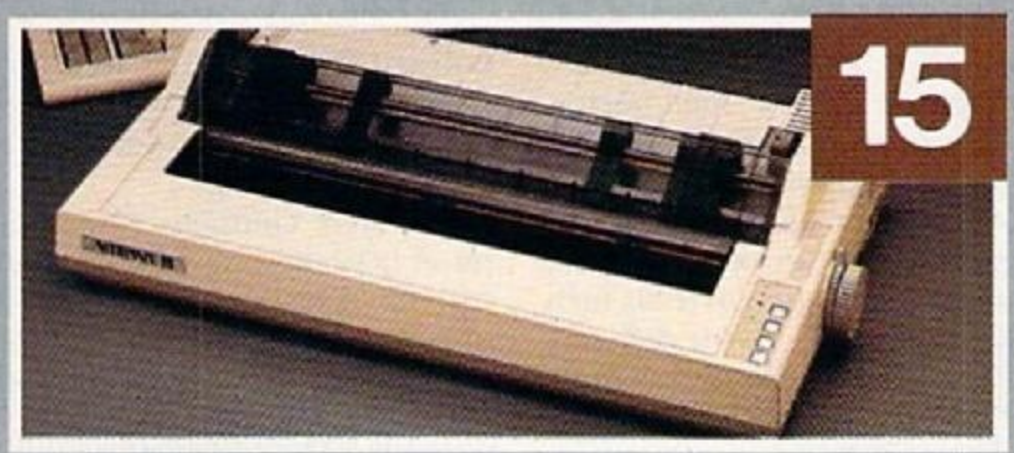
THE COMPATIBLES



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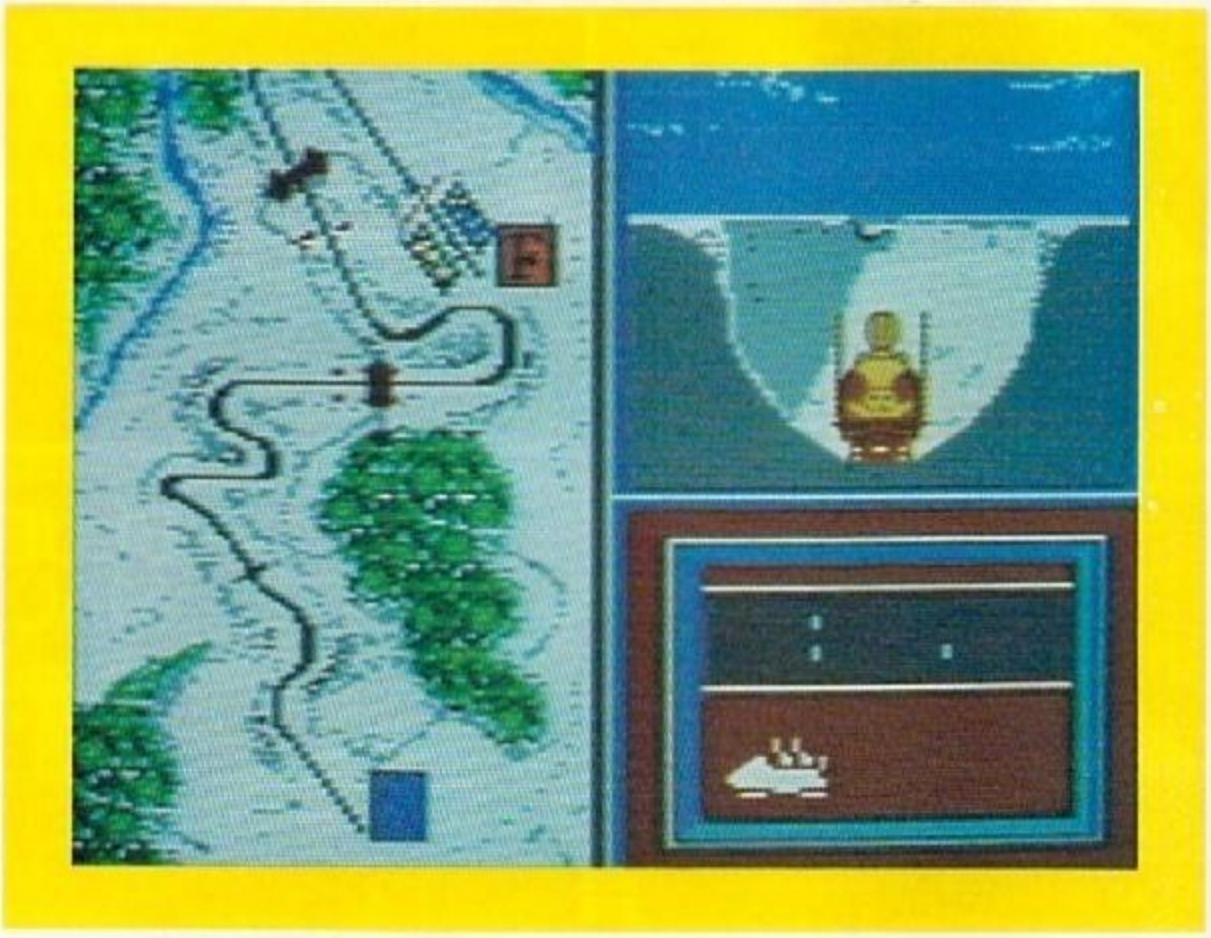

Aside from its few drawbacks, White Lightning is a high-performance development system. Buying a graphics-development system for your C-64 won't make you a games designer, but you can certainly benefit from the application of tools such as White Lightning. *(Oasis Software, 377 Oyster Point Blvd., South San Francisco, CA 94080. C-64/$49.95 tape, disk.)*

Jon Bryan
Albuquerque, NM

Winter Games — A

This May Not Be an Olympic Year, but You Can Still Go for the Gold

No twisted knees or swollen feet. No frostbite. No landing on your head. No years of grueling training. Just the possibility of bringing home the gold for you and your country. In short, the occasional thrill of victory, with no agony.

To qualify for Epyx Software's Winter Games, you need only one or two joysticks and a competitive spirit (though quick hand-eye coordination is helpful).

Six events are offered: ski jump, bobsled, figure skating, freestyle skating, hotdog aerials, speed skating and the biathlon (cross-country skiing and rifle shooting).

You may compete with the computer (a surprisingly fit opponent) or with up to seven other players. Those of you in less than tip-top shape may practice all the events as much as necessary, lest you shame your country with a shoddy performance.

Most events are accompanied by upbeat music, and all events feature finely detailed graphics. The biathlon isn't the most exciting event (I like the bobsled and the hotdog aerials), but its setting, which consists of snowy terrain, mountains, pine trees, a gurgling river under a wooden bridge and blue skies dappled with white clouds, is pleasantly picturesque.

A consistent part of each setting is the audience, which will whistle and applaud you if you score a 10. (It's nice to have fans, even if they do exist only on disk.)

The variables on which scores are based differ according to the event. In the skating and hotdog aerial events, your score is based on style and difficulty (there are several maneuvers you may perform). In the biathlon and bobsled, your score is based on the speed of your performance. In the ski jump, points are awarded according to distance and form.

That you can always improve your score (unless you're always a perfect 10) or try different movements or combinations of movements makes the game more interesting and enjoyable. The novelty of a game whose options are quickly and easily exhausted soon wears thin.

Winter Games provides well-written documentation that is easy to understand. The game's features are explained, along with instructions on how to participate in each event and how you can acquire the highest score. There is even a short but informative explanation of how winter sports began.

Ultimately, Winter Games is just plain fun. And its sound and graphics, which certainly win a gold medal, greatly contribute to the game's entertaining quality.

Moving the little figure skater around the rink, urging her into double axel jumps, sit spins, whatever, is fun (though you may not think so when you become a serious competitor). And watching her fall is, I'm sorry, amusing.

In the hotdog aerials, sending the tiny skier flipping through the air and landing, *plop*, every which way in the snow, is also, I'm sorry, funny.

And it's satisfying and oddly thrilling to move your skier effortlessly from a back scratch into a back flip and have him land on his feet to the sweet sound of applause and whistles.

Who knows. . .All this vicarious activity might even inspire you to jump on your snow saucer and do a little sliding. *(Epyx, 1043 Kiel Court, Sunnyvale, CA 94089. C-64/$29.95 disk.)*

Marilyn Annucci
***RUN* staff**

Stunt Flyer — B

This Flight Simulator Lets You Perfect Those Loops and Rolls

So, you've flown the F-15 Strike Eagle and Flight Simulator II. You consider yourself good. But has anyone ever shown you just what you look like up in the air?

Stunt Flyer will do just that, and,

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WINTER GAMES™
THE QUEST FOR THE GOLD CONTINUES...

You've captured the gold in Summer Games® and Summer Games II™. Now it's on to the *Winter Games*! And what an incredible setting—a completely realistic winter wonderland featuring *seven* action-packed events.

At the Ski Jump you control your form in mid-air, knees straight, leaning forward. Hot Dog Aerials challenges your courage *and* your sense of humor. In Figure Skating you leap into Double and Triple Lutz jumps—wow the crowd with a perfect Camel into a Sit Spin. It's timing and style that counts. Free Skating lets you choreograph your own routines. In Speed Skating it's you against a fellow speed demon—the fastest human beings on level earth! And the Bobsled—still faster as you fly around hairpin turns, leaning hard to stay in the tube. Finally the Biathlon, the ultimate challenge to your endurance in cross-country skiing and marksmanship.

All of this fun and excitement is easy to learn and play. You control the action with the joystick, animating your player for style and rhythm. You choose the country you want to represent. Listen to its national anthem. Then it's practice, training and learning a winning strategy for each event. Now the *Opening Ceremony* and the competition begins—against your friends or the computer. Will you be the one who takes the gold at the *Awards Ceremony*? Will your name be etched amongst the *World Record* holders?

The quest for the gold continues... And it's all here—the strategy, the challenge, the competition, and *pageantry* of Winter Games!

	APPLE	MAC	C64/128
Winter Games	✓	✓	✓

* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

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until you really learn to fly, your ego is going to take a beating from it.

This simulator also just might teach you to fly. The manual is the best tutorial I've seen on the aerodynamics of flight.

The manual fully illustrates such stunts as rolls, loops and Immelmanns, and tells you what to do with the controls at each point in the maneuver. Read it carefully: It's like being in ground school and there will be a test.

From the main menu you may choose to watch an air show, fly freely or perform a stunt. Both joystick and keyboard may be used to control your craft.

If you decide to perform a stunt, you're presented with another menu from which you may choose one of about 15 classic moves. Select one and you're on your way.

Your view is out of the cockpit, looking at a green landscape that is sketched with mediocre graphics. The instrument panel is drawn much better than the landscape and contains a few gauges you may never have seen on other flight simulators.

You can choose to review your completed stunt and watch your performance from outside the plane as a ground observer would see it.

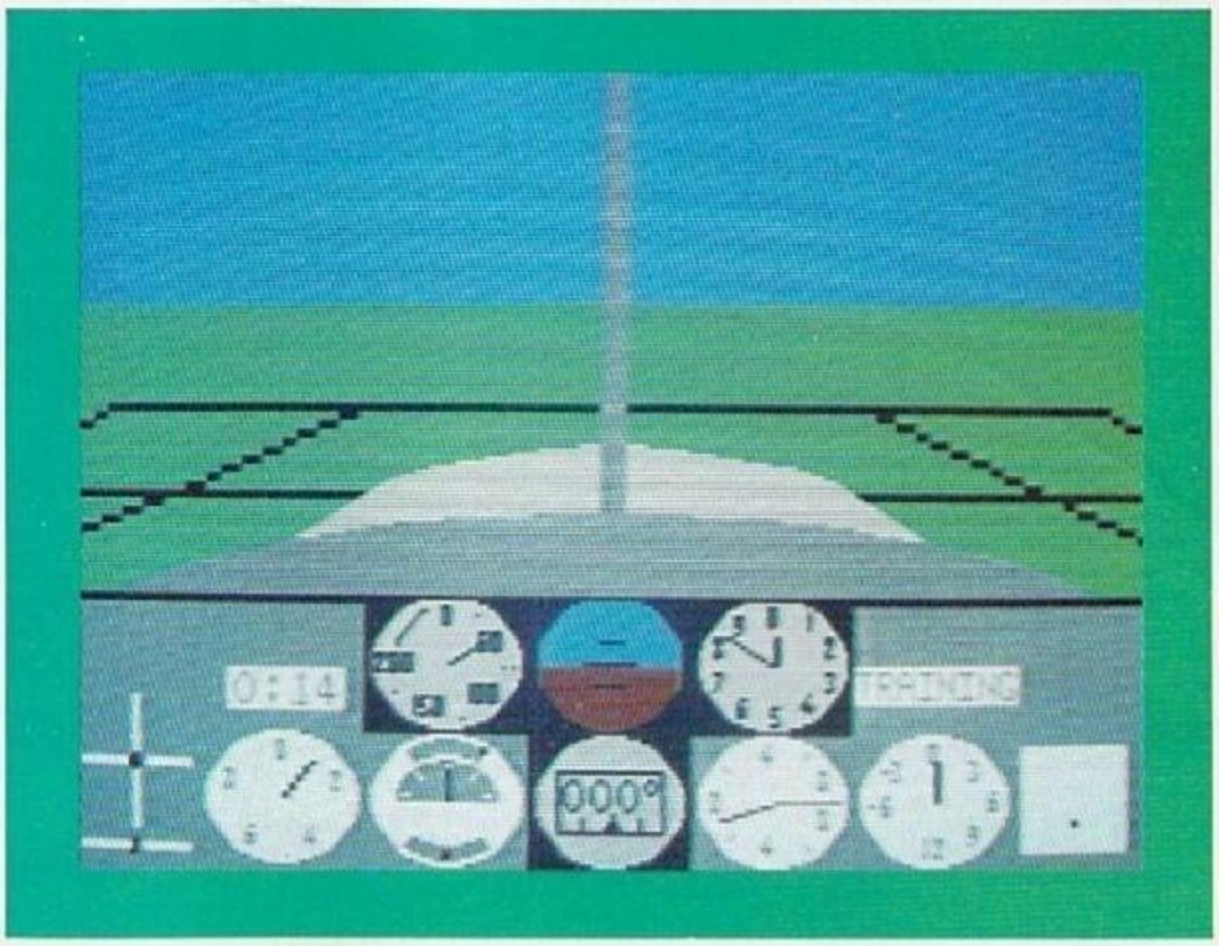
Without this instant replay feature, Stunt Flyer would be only a mediocre simulator. With that feature, it becomes a constant challenge as you try to improve your performance and better your score. (Judges evaluate your performance and award points accordingly.)

In the competition section of the game, you put together your own series of stunts, save them to disk, and then enter them in Sierra's Stunt Flyer Contest and try for the big money.

The program's graphics are only adequate in execution, and the crash scene—you'll probably see a lot of this—is a static rendering that looks as if it were lifted out of a coloring book. Sound is limited to the buzzing of your engine, and the instant replay feature isn't really instant, for it requires disk access to put your moves and gyrations into coherent form. (However, we can't blame Sierra for slow disk access.)

Even with these faults, Stunt Flyer accomplishes its goal, which is to provide you with new challenges. Although you'll be humbled by the instant replay feature, it's the saving grace of the game and the feature that will make you determined to try it again and get it right. *(Sierra, PO Box 485, Coarsegold, CA 93614. C-64/ $24.95 disk.)*

Ervin Bobo
St. Peters, MO



1541 Disk Drive Alignment Program

B

This Package Lets You Diagnose and Cure Your Drive's Alignment Woes

If you use software with a copy-protection scheme involving intentional read errors that produce a rattling sound when loading, you're probably on the road to disk drive alignment problems. If you have trouble loading programs, especially commercial software, you may already be there.

There's little solace in knowing that you're not the only person to suffer this particular type of problem. However, there is reason to cheer. You can realign a balky drive at home (it takes only an hour or two) and get right back to your computing.

CSM's 1541 Disk Drive Alignment Program walks you, step by step, through the alignment process. All you need are a few screwdrivers, a little time and patience, and the courage to open up your disk drive.

Following instructions in the 18-page manual, you learn to disassemble the drive (remove 12 screws), check and adjust the motor speed, check alignment and make the adjustments necessary to return your 1541 drive to peak operating condition.

The manual is adequately illustrated and the directions are easy to understand. While the hazard is minimal, the author is to be commended for clearly pointing out the potential danger of working on a device with exposed 117-volt wiring.

CSM provides two disks. One contains the alignment program that operates the drive during testing. The other is a precisely recorded calibration disk that provides the standard to which your drive will be aligned.

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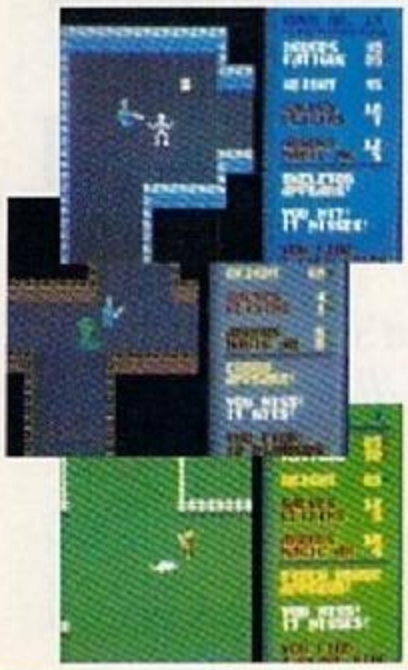

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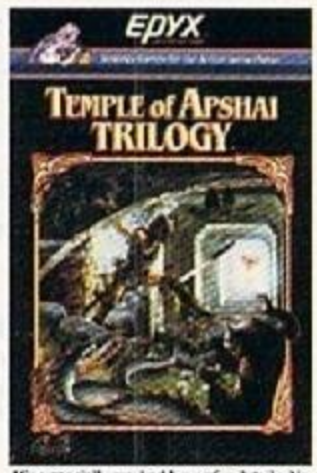
Temple of Apshai Trilogy	✓	✓	✓	✓	✓



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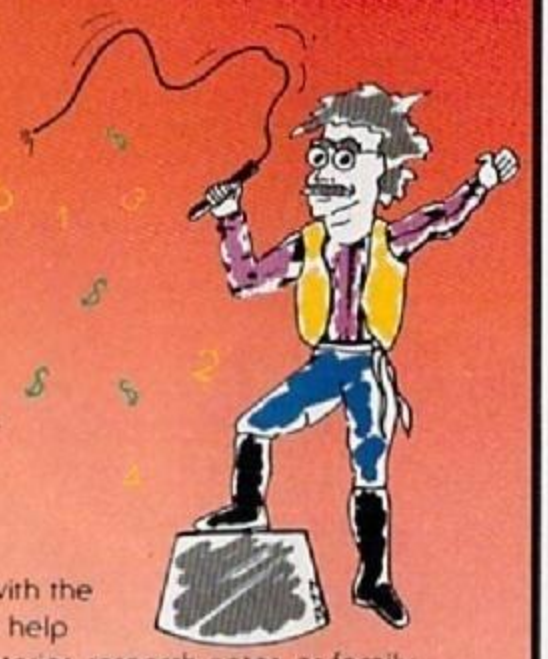

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Software Gallery

This package offers a unique method of verifying alignment; this method can also be used to monitor your drive's performance and alert you to future alignment problems before they interfere with the smooth operation of your software.

This alignment check causes the 1541 to read and write to several tracks and sectors on the calibration disk. The total time required to accomplish this task is computed and reported on-screen. A substantial increase in this timing number means it's time to adjust your drive's alignment.

Also included are instructions for "The Fix," a positive method of preventing further alignment errors due to additional slippage of the head-positioning cam. Requiring further disassembly of the drive mechanism, this procedure is not for the mechanically faint of heart. It is, however, certain to provide a more secure repair than the frequently suggested trick of putting a drop of glue on the top of the offending mechanism.

This procedure requires that you drill a hole and secure the head-positioning cam to its shaft with a steel pin. If Commodore had built the 1541 with this type of construction in the first place, alignment problems would probably occur less frequently and alignment programs wouldn't be as necessary as they are.

However, since alignment woes are so common, this package should prove valuable to you. It provides a measure of prevention as well as a cure for your disk drive's alignment problems. *(CSM Software, PO Box 563, Crown Point, IN 46307. C-64/$44.95.)*

John Premack
Lexington, MA

Project: Space Station

A

Learn What's Involved
In Putting Together
A Space Shuttle Mission

It's been a long time coming, but Project: Space Station is finally here. It was worth the wait. Without

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EPYX PRESENTS LUCASFILM GAMES™ RESCUE ON FRACTALUS!™

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You've joined an elite Rescue Squadron, flying to the hostile planet Fractalus to confront the ruthless enemy Jaggies head on. The mission is a treacherous one for, as everyone knows, the cyanitric acid atmosphere on Fractalus is fatal and Jaggi saucers are cunning. You're needed to rescue Ethercorps pilots shot down and stranded on that brutal planet, and to help lead our forces to victory . . . for the merciless Jaggi onslaught must be stopped to preserve the future of our galaxy.

Rescue on Fractalus! is a rescue and space action game with realistic 3-D flight simulation. You pilot your Valkyrie Fighter through the canyons and around the mountain peaks of the planet Fractalus to rescue fellow pilots, do battle with enemy saucers and destroy enemy gun emplacements.

We supply the Long Range Scanner, Dirac Mirror Shield and Anti-Matter Bubble Torpedoes . . . YOU supply the skill and guts! Take the challenge: The perils of Fractalus await you.

	C64/128	ATARI	APPLE
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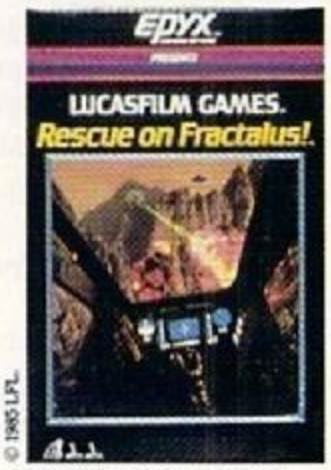

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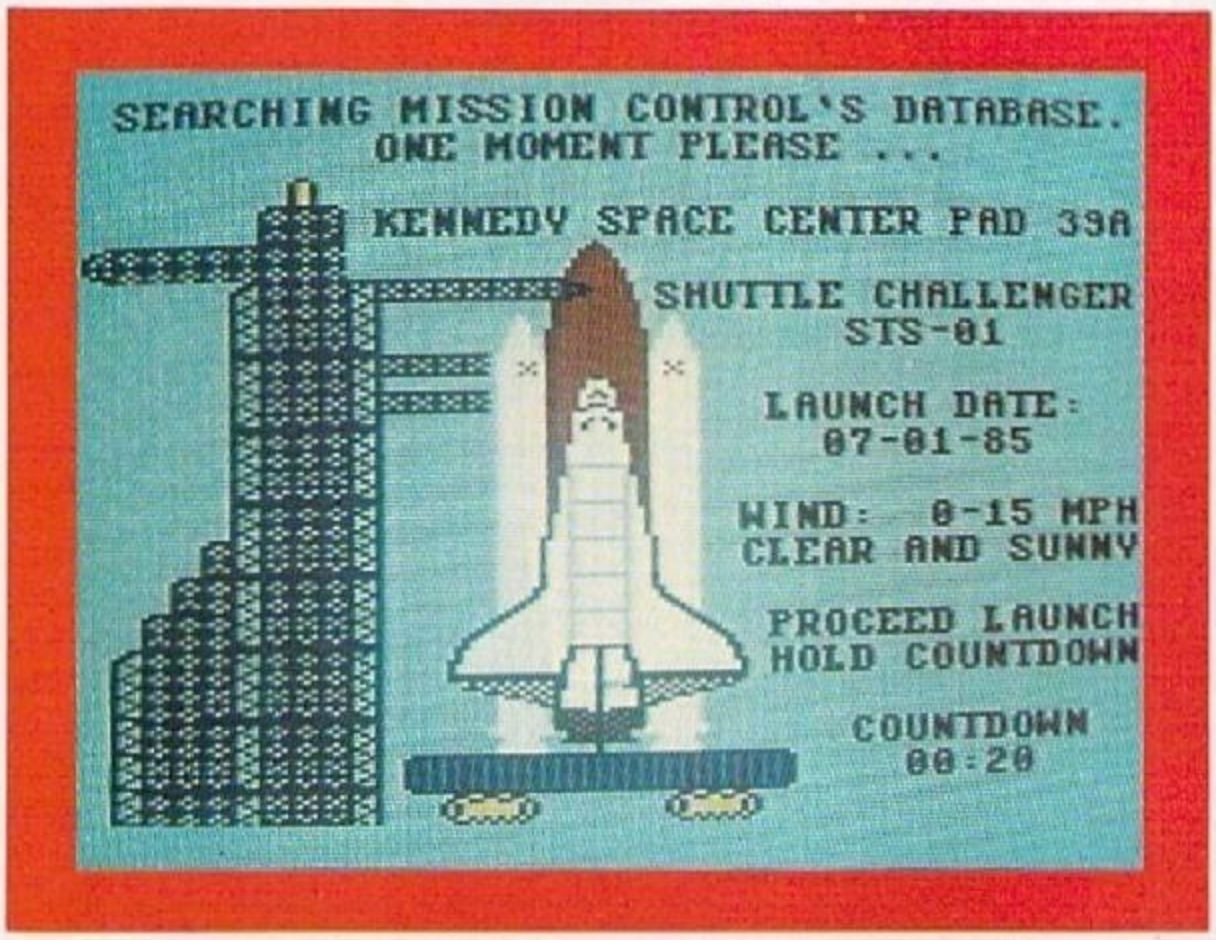

a doubt, it is the most complete simulation ever devised for the C-64.

Don't expect to jump into a hot rocket and fly by the seat of your pants. In fact, this is not a flight simulator; rather, it is a mission simulator and the mission is the most complex ever undertaken—to build a permanent, working space station by the turn of the century.

You begin far in advance of your first flight, in the planning stage. Here, you must allocate funds for equipment, station modules and operations. As NASA does, you may earn money by selling shuttle space to private corporations for research projects, thus bolstering your budget for future flights.

Next, you select a crew. From a field of 32 candidates, you choose at least six for each mission. Your selection is based upon skills needed for a particular mission, balanced against personality traits that will determine whether your crew can function in harmony.

With this done, you're ready to schedule a launch date. Because many missions will be required, you'll want to set the earliest possible date from the time-line on your screen.

At the launch, you have a colorful view of the shuttle poised at the launch-pad. Your screen shows date, time, seconds remaining to launch and weather conditions. As in real life, a launch may be delayed or even aborted.

What you do in orbit depends upon whatever you had planned to do. You may simply be ejecting modules for future assembly or you may be involved in extravehicular activity in actually assembling your station.

NASA's planning for this project spans years, and your own involvement with the simulation will take days or weeks. Fortunately, you may save missions to disk at any stage.

Documentation is excellent, and the manual is aided by the extensive tutorials within the program. Superb graphics, with dozens of different screens, add to the feeling that you're working on something real—the acid test of any simulation.

Though it won't prepare you for a degree in space engineering, Project: Space Station is very highly recommended for anyone who is interested in just what is involved in a shuttle flight and, especially, for anyone involved in any way with the President's Young Astronaut Program. In fact, it is an absolute must. *(Human Engineered Software, 390 Swift Ave. #14, South San Francisco, CA 94080. C-64/ $39.95 disk.)*

Ervin Bobo
St. Peters, MO

The Original Boston Computer Diet

Shed Those Extra Pounds and Learn to Plan a Healthy Diet

The Original Boston Computer Diet, written by three medical doctors and a nutritionist, is an impressive and useful program that will be of interest to anyone who has ever tried to wish off a few excess pounds.

This interactive program, originally written for the IBM PC, has been very nicely implemented on the C-64. Crammed into almost every available byte of RAM, this is a quick and easy-to-use program that will help almost anyone plan and maintain a sensible and healthy weight-control program.

The first thing that impressed me was the program's speed. I was also pleased with the heavy emphasis placed on proper eating habits and the medical consequences of dieting. The program contains ample warnings about dieting and excessive exercise unless your medical condition permits.

Your first session with the program allows you to choose which of three distinct personality types will be your personal "counselor." Your counselor leads you through a series of questions about your medical history, lifestyle and eating habits.

Daily sessions for the next week are spent reporting your food intake, setting goals and developing your ability to plan meals and regular periods of exercise. Your counselor offers encouragement and also points out bad habits, poor food choices and any excessive consumption of sweets, fats or alcohol.

The Diet's database contains almost 400 commonly eaten foods and can be expanded to include another 100 of your choice.

In subsequent weeks, you are expected to keep daily appointments with your counselor and report exactly what you've had to eat. After the first week, you are no longer given

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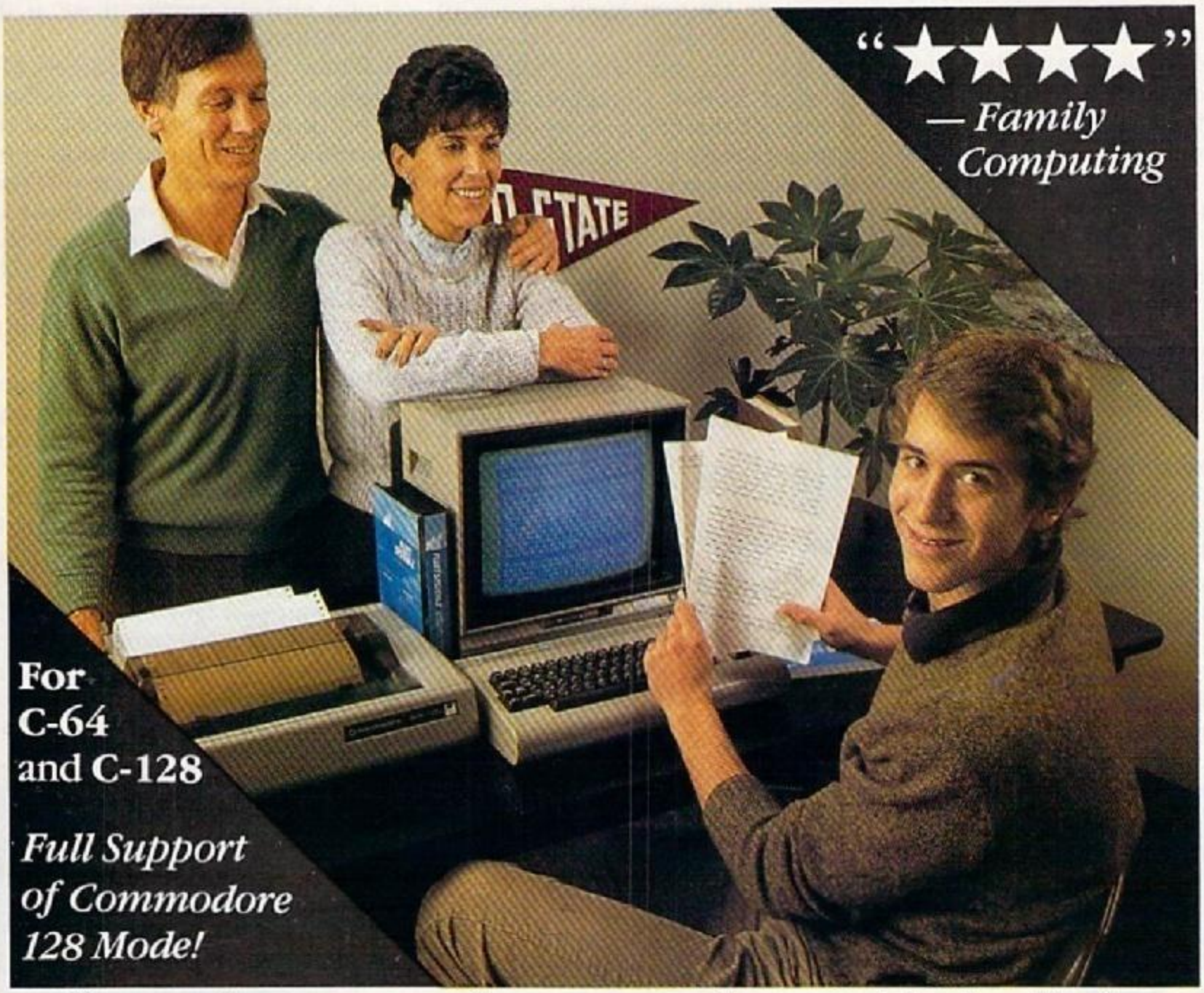

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Up till now, you'd have to spend a minimum of about $70 to get a good word processor for your Commodore 64™/128™. And if you added a small, *separate* spell checking program, you'd be out well over $100!

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suggested menus for each of your daily meals, as you are expected to do your own planning.

Any diet requires a great deal of commitment in order to be effective. The simple daily task of keeping an appointment with your computer counselor is an excellent aid in maintaining that commitment.

The Original Boston Computer Diet occupies both sides of the program disk. Side 1 contains all of the preliminary information necessary to begin your diet. Your daily sessions are initiated by booting up side 2. Side 1 is copy-protected, while side 2 is not.

Even though all daily sessions can be run from a backup of side 2, the program occasionally asks you to insert side 1 (the master disk). This is apparently done to prevent the program from being shared or illegally duplicated, but it also prevents other members of the family from using the program. I found the occasional request to switch disks somewhat annoying, since the master disk must always be close at hand instead of tucked safely away.

Aside from this flaw, I found The Original Boston Computer Diet to be one of the more innovative and useful software packages released for the Commodore in some time. *(Scarborough Systems, 55 South Broadway, Tarrytown, NY 10591. C-64/$49.95 disk.)*

John Premack
Lexington, MA

Success with Algebra Series

Here are Four Self-Paced Alegbra Tutorials That are Designed for Grades 7–12

If you were to survey high school students on their least favorite subject, the chances are that algebra would turn up among those at the top of the list.

While CBS Software's Success with Algebra Series won't bring students to any greater understanding of the discipline's usefulness outside of the classroom, its self-paced tutorials take much of the mystery out of advanced linear equations, binomial multiplication and factoring. The program leads students, step by step, through the operations required to solve specific problems.

During practice with actual equations, students must correctly complete each step in the solution process before continuing to the next step. In this way, mistakes are easily identified as soon as they are made, and the student is guided to the equation's correct solution.

The four packages that make up the series are Binomial Multiplication and Factoring, First Degree and Advanced Linear Equations, Graphing Linear Functions, and Simultaneous Equa-

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A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the best printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seikosha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking ***quality*** printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.

Forms? Yes!
Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only $11.00. Order *#2001.)*

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around $500 or more. *Not now!* We sell this fantastic printer for **only $259.95! You need absolutely nothing else to start printing — just add paper.**

No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, cable included

IBM-PC and compatibles, Order #2100, plus 8' cable #1103, $26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

We also have interfaces and cables for other computers not listed. Call Customer Service at 805/987-2454 for details.

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tions/Quadratic Equations. Each one comes with a pocket-size manual that briefly outlines the program's operation and provides a succinct explanation of the methods involved in solving the problems. More detailed instructions are provided on the program disks, and special help screens and mini tutorials can be accessed while you are actually working out an equation.

While performing binomial multiplication according to the FOIL method (First, Outside, Inside, Last), for example, if you enter an incorrect product for any of the four pairs of terms, you are given a chance to reconsider your answer. If your second attempt to multiply the two terms is also wrong, arrows link the specific pair that should be multiplied and you are told what the product should be. You can then go on.

Success with Algebra also uses your C-64's graphics capabilities for visual emphasis of certain algebraic principles. To graph linear functions, for example, you simply select appropriate values for x and are guided toward finding the corresponding solutions for y. Once you have three pairs of coordinates, you're presented with a graph and instructed to plot the three points of the function by moving a cursor to the proper point and pressing the return key. After all three points have been plotted, the computer draws a straight line through them to illustrate the equation.

After each set of problems you complete, you're provided with a detailed summary of your errors. Although this seems to be a good way of letting students know where they're having the most problems, a percentage of the total that were answered correctly, along with an appropriate message of praise or encouragement, could have been supplied as well.

This minor complaint aside, the Success with Algebra Series is a valuable study aid for high school students, and a great way for rusty college students to brush up on their binomials. *(CBS Software, One Fawcett Place, Greenwich, CT 06836. C-64/ $34.95 each disk.)*

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Add sparkle and excitement to your videotapes with screen displays from your computer. This article tells you how to make the VCR-computer connection.

Let me tell you a sad story.

Some time ago, a man came into my video store looking for advice on how to improve his videotapes of weddings. Since there aren't a lot of us doing that, I was glad of a chance to share some experiences and give him a few tips. After a while, he apparently decided I could be trusted, so he revealed to me his great secret.

"I'm using a computer with video," he said. "I can make titles with it."

Having just begun my own experiments with such titling, I was more than interested.

"Really?" I asked.

"I'll show you," he said, and proceeded to run his videotape, which revealed that he had simply pointed his video camera at a green screen and taped such displays as:

Maid of Honor ..... Kathy McCoy
Best Man ..... Herbert Ross

There is a better way.

Making the video connection involves more than the physical hookup of computer to video recorder. My customer had used a word processor because he'd forgotten the computer's ability to generate images and sound. He used it because it was a way to convey information, not knowing that what he really wanted to convey was emotion and excitement.

But you're not going to shoot a wedding, so why bother? Why put computer images on videotape? Sure, you could tape your best game of Pac-Man and replay it whenever you felt frustrated, but there are other reasons.

As I indicated, I videotape weddings, parties, bar mitzvahs. . .anything a client will pay me to shoot. The titles and graphics are an extra, something the client didn't expect to get, something that gives my work a more professional look.

That look can dress up a variety of video projects. Maybe you want to create your own title for your videotape of, say, classic horror movies. Or you may want to string together computer images and sequences to make an animated short subject. Someday, you may transfer your family's old home movies to VCR tape. Computer titles and captions can do a lot to help the flow and to smooth the transition from, say, the vacation movies of '74 to the Christmas movie of '75.

The Physical Connection

A direct physical connection between computer and

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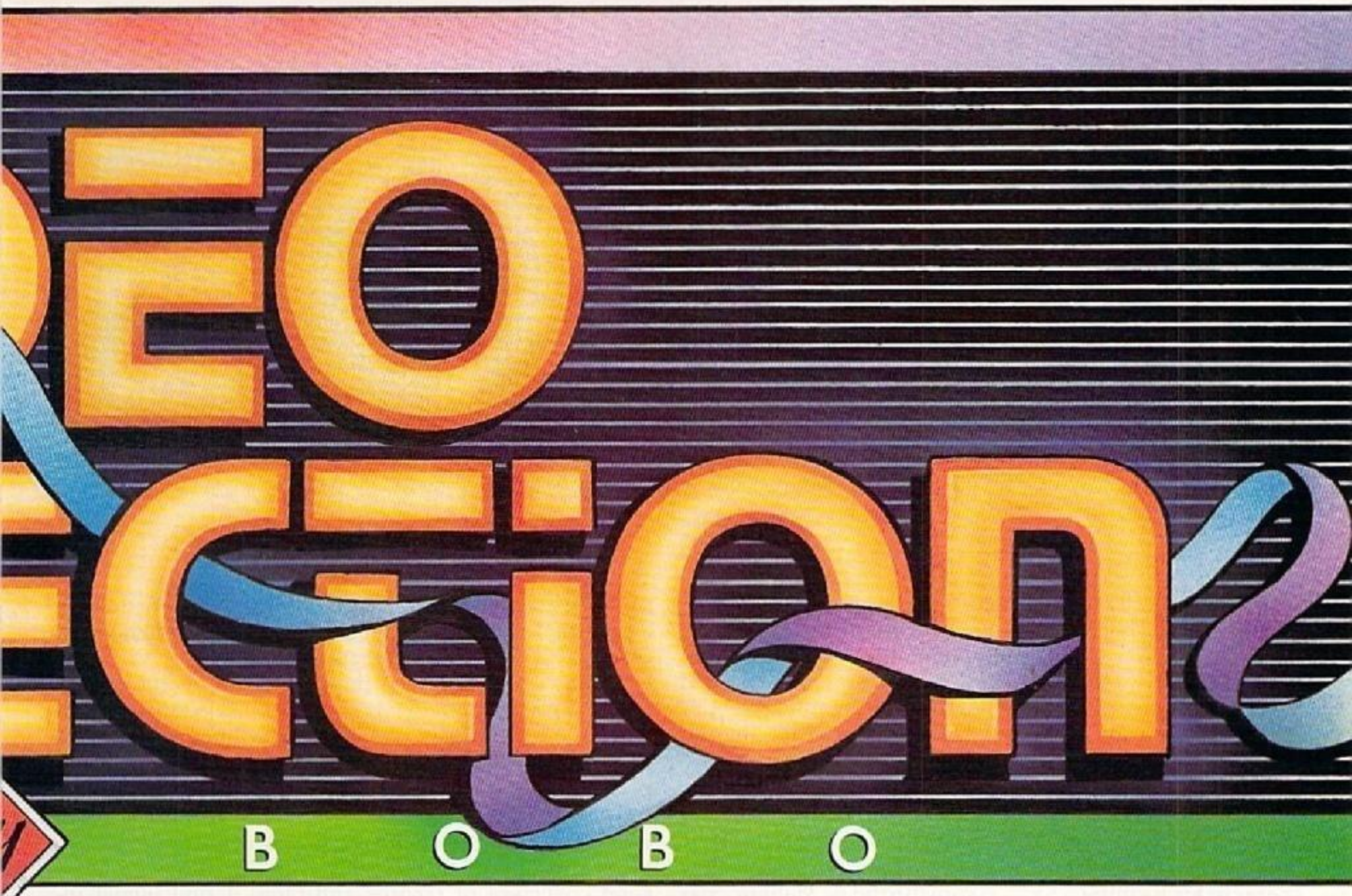

video recorder leads to a sharper image with pure colors. The composite video signal that would normally be interpreted by your monitor or CRT can instead be directly interpreted by any VCR.

With the Commodore family of computers, you have access to the DIN video-out port on the rear of your computer. The DIN plug originally supplied with the Commodore 1701 monitor (and still available in stores) is ideal. It terminates with two RCA plugs—one for audio, one for video. Simply plug the one marked VIDEO into the video-in jack on your VCR (see Photo 1).

In order to see what you're doing, you then use a cord with RCA plugs on both ends to make a connection from the VCR video-out jack to the video-in jack on your monitor. With the Commodore 1702 monitor, this is the video jack on the front, *not* the back. (Remember, we're talking about composite video. A VCR will neither put out nor accept an intelligent signal broken down into chrominance and luminance. Therefore, the three-terminal cable that came with your Commodore 1702 monitor cannot be used.)

If you're using a television set as a monitor, you're using the RF converter that came with your computer. This is the little box that is attached to your antenna terminals. To use this on a video recorder, you must attach it to the VCR through the tuner.

Illustration by Jack Crompton

Remove the antenna wire that's currently feeding programs into your VCR and attach your computer's RF converter box in its place.

(Since the RF box terminates in a flat, 300-ohm wire, and video recorders have a connection for a 75-ohm cable, an adapter may be required. These are inexpensive, and you can get them at any radio or video shop.)

The cable now connecting your VCR to your TV may remain in place to allow you to watch as your titling is being recorded.

With either connection, simply bear in mind that what goes into the VCR must come out to the TV or monitor. You're simply putting the VCR in line between computer and TV.

With the VCR tuner set (and fine-tuned) to channel 3 (4 in some areas), you'll be able to record computer output as easily as you record a TV program.

That's the physical connection. Now what about the mental?

Plugging into Creativity

The title should fit the subject, so it helps to think about just what you are doing and plan ahead.

For the first birthday party of a boy who was born on July 4th, I used large letters formed from reversed spaces to write on the screen, "Happy Birthday, Donald." The

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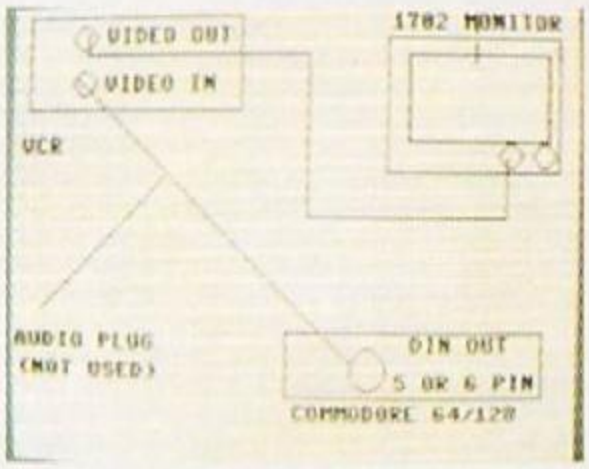

Photo 1. *How to connect your computer to your VCR. (This slide was created with DOODLE, from City Software.)*

Photo 2. *A sample of how you can personalize your videotapes. (This display was created with Broderbund's The Print Shop.)*

Photo 3. *A sample of how making the video connection can add pizzazz to your videotapes.*

screen then cleared and went to a large red firecracker, with a flickering yellow flame. (For the flame, I changed the cursor to a spade symbol and allowed it to pulse in its usual way.) After a moment, the screen border flashed rapidly through all eight colors, giving the impression of an explosion. Backed up on audio with rousing martial music, it was an extremely effective first effort.

For the sixtieth birthday of another client, I placed a large 5 in the center of the screen, then had it change to 10, 15, 20, etc., until 60 appeared in a larger font. After the screen cleared, I cut to a city skyline with large yellow spotlights forming a "V." "Happy Birthday, Mahlon" was written in the sky between the cones of light, and, just above the skyline, fireworks made of sprites began to flicker.

For the wedding rehearsal dinner of a couple who both happened to be lawyers, the groom's father (also a lawyer) planned to appear in a robe and white barrister's wig and elicit the usual toasts and best wishes by calling upon the guests for testimony.

It was an idea I liked. I opened with a gavel that filled the screen, cleared and went to a bordered announcement that said "Rehearsal Dinner." The screen then cleared and gave the second title card, "And Preliminary Hearing of"; the screen again cleared and gave the names of the defendants—uh, I mean the bride and groom. (See Photos 2 and 3 for samples of my efforts.)

The principle behind this project is to send an image from the computer to the VCR tape, then to the monitor. This allows you to personalize VCR films with titles, graphics screens and other documentation.

If you're doing this kind of video tape recording professionally, don't overlook the opportunity to promote yourself. In the instances I've cited, members of the clients' families will be watching these tapes and, sooner or later, one of them will need my services.

Therefore, at some point, an animated "Videography and Graphics by Erv Bobo" will appear, embellished by sprite drawings of a video camera and a TV set. (Incidentally, I liked my logo so much that I dumped it to a printer, took it to a stationery shop and had it reduced and printed on business cards.)

However, don't allow your logo to dominate the rest of the titles. Get it on and get it off. Although you deserve credit for what you've done, some of your audience will see it as a commercial interruption.

Timing of your titles is important, too. A title should be on the screen long enough for the slowest reader to absorb, but no longer. Audiences get impatient, always in a hurry to see the part where Aunt Tilly falls into the punch bowl.

Another reason for timing is sound. A musical background for your titles helps the flow, and the music should be as appropriate as the titles. Although I have a fairly good collection of records and tapes, I find myself increasingly being drawn to one particular piece of music, for it is, in a sense, all-purpose. Starting slow and melancholy, almost like a hymn, it builds to a bouncy rhythm and crashing crescendos.

By working with this one song, I find it easier to pace my titles and to determine the overall length.

Lest you worry about royalties on music used for such purposes, one of my friends who is knowledgeable about legal matters tells me this does not really fit the definition of "public performance for profit." It is, rather, like reselling a book that is then used for reading aloud to a group.

The C-64 and C-128 have excellent graphics capabilities. You may either create your own graphics or make life a little easier by obtaining one of the many available graphics software packages.

I have only a little programming ability, so the following are my favorite graphics programs:

Designer's Pencil

In Designer's Pencil, by Activision (2350 Bayshore Frontage Road, Mountain View, CA 94043), all programming commands are built in and must be selected with joystick and fire-button. The built-in commands put an end to syntax errors, but I still wish I could select the commands from the keyboard. I dislike any software that forces you to use your joystick as a mouse.

The redeeming quality, for purposes of this discussion, is in the execution of your design. Rather than appearing immediately before you, it is drawn by a little yellow

Continued on p. 109.

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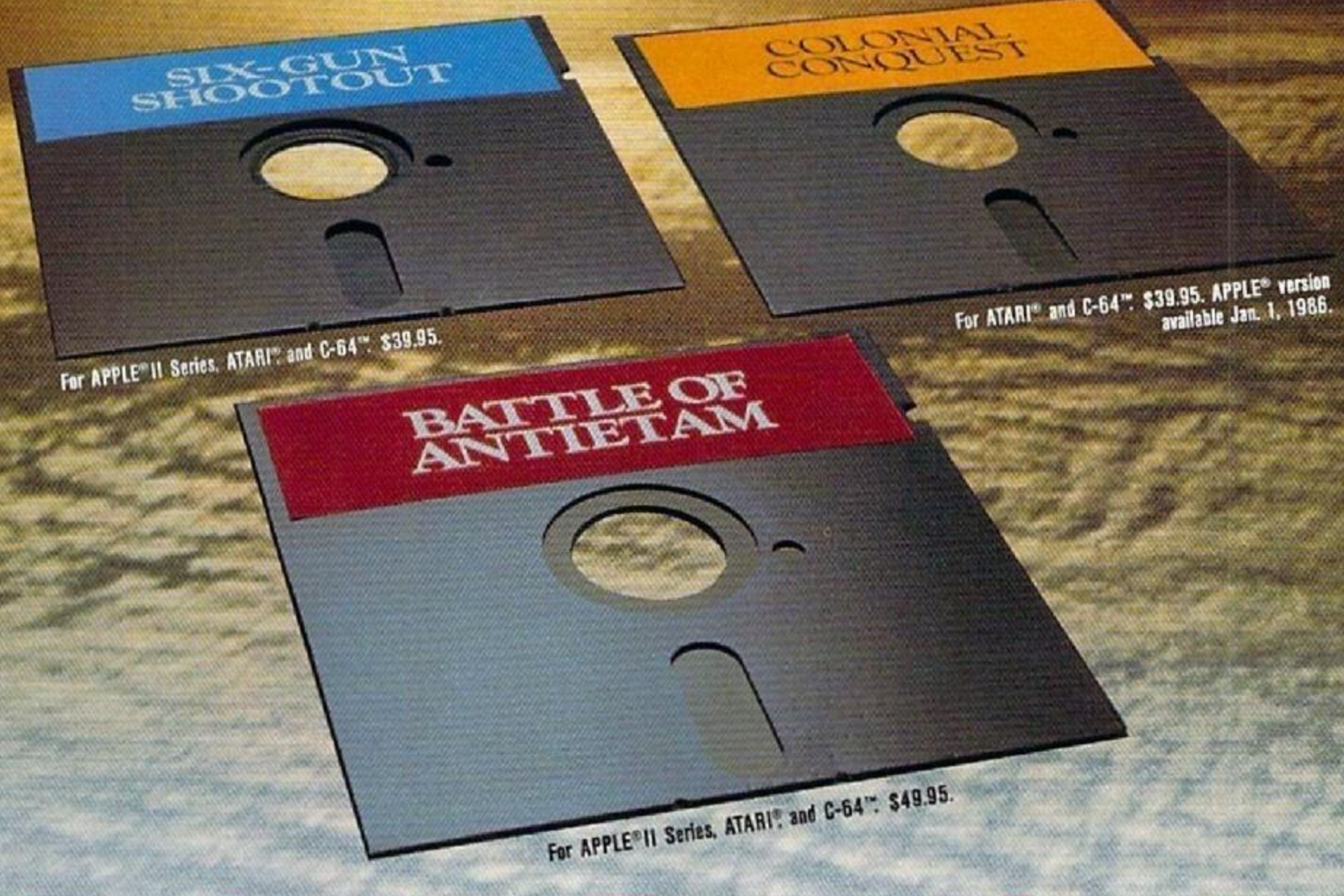

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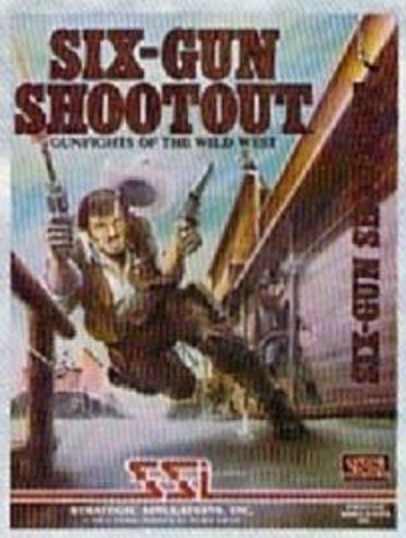

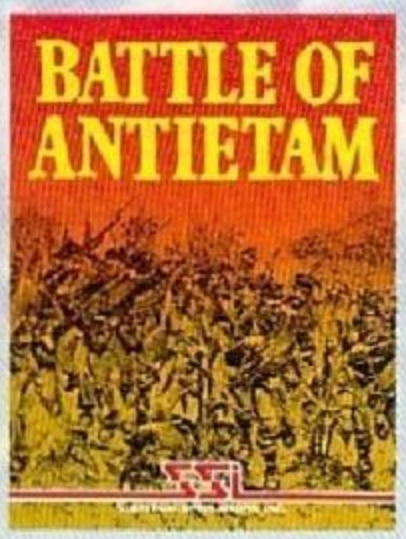

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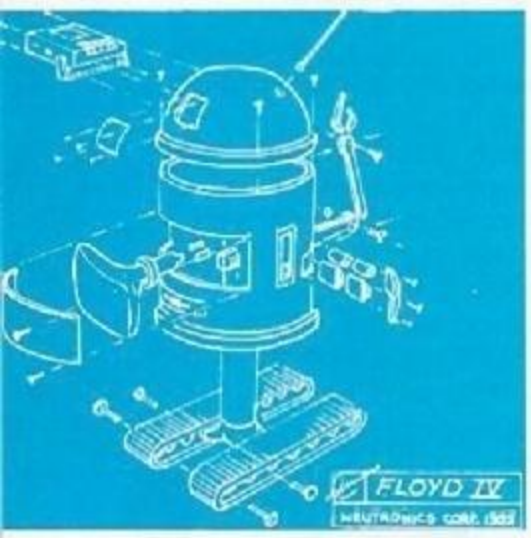

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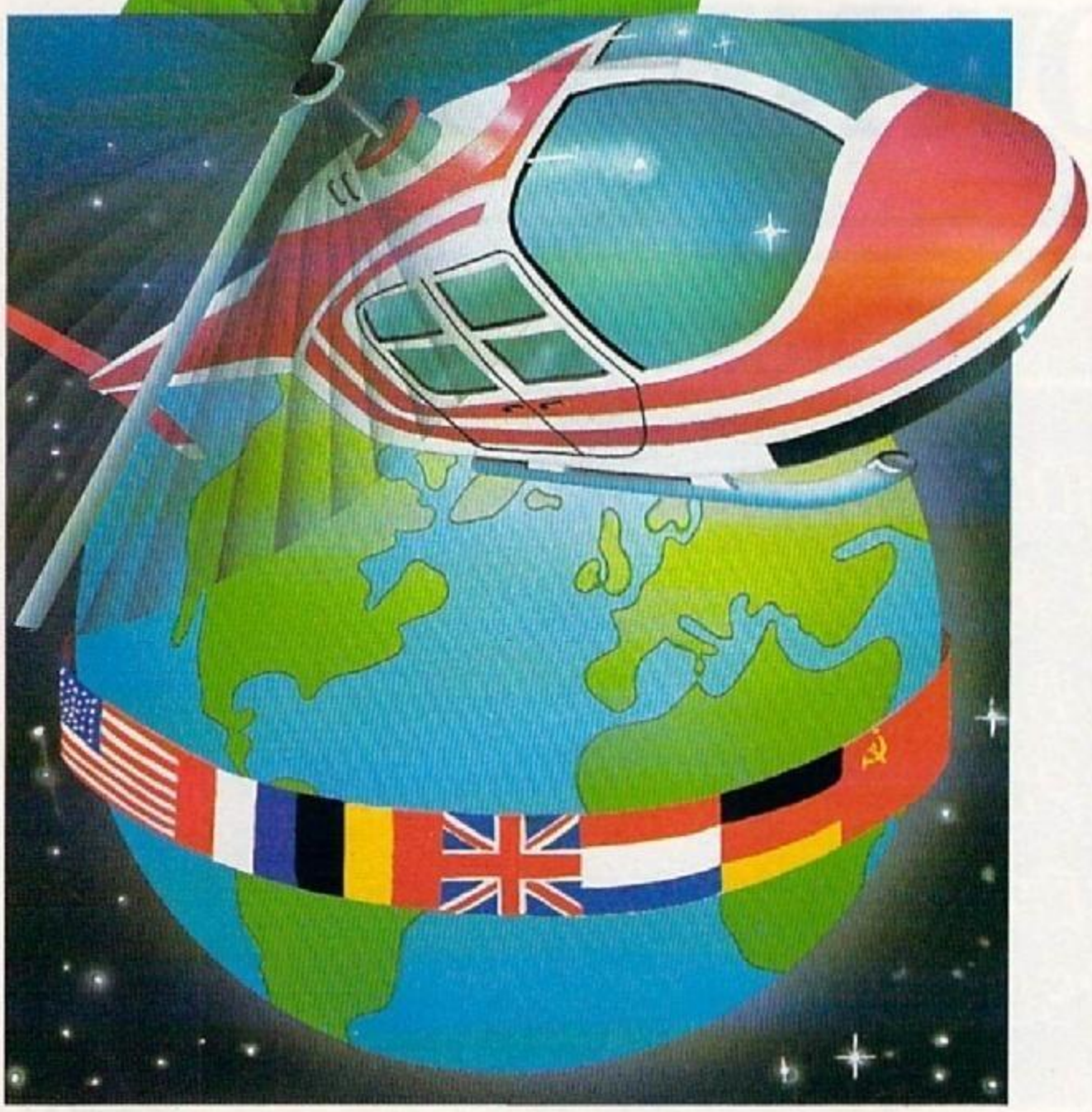

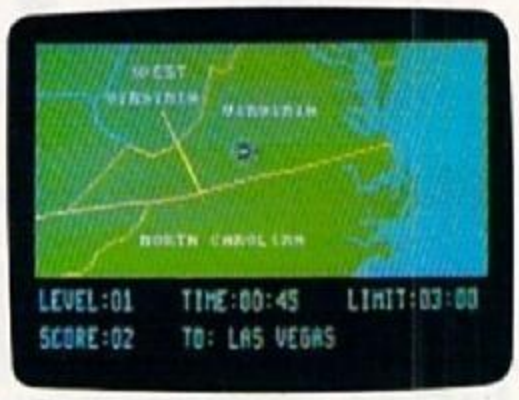

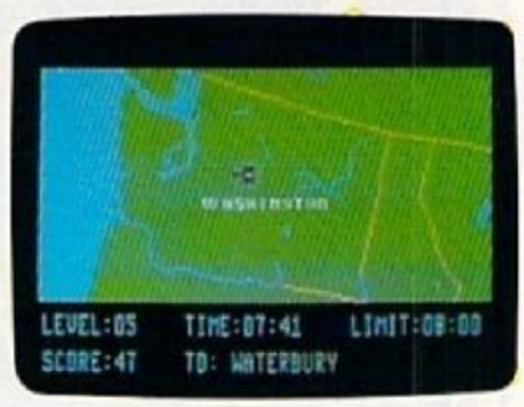

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Connecting your Commodore to a carousel slide projector opens up exciting avenues in education and home entertainment.

By DANIEL MORRIS

Picture a study carrel that contains a Commodore computer, a disk drive and a monitor. Sitting beside this is a slide projector with a small projection screen. As pictures appear on the projection screen, a student responds to them by interacting with the computer. As the student progresses through the program, the slides automatically lead his progress, changing as the program changes and advancing in response to the answers that he gives to certain questions in the program.

In greater numbers than ever before, educators and home users are becoming aware of the potential of the microcomputer as a powerful learning tool. Until recently, the computer was viewed as some sort of superior calculator, scientific instrument or medium for teaching computer languages. This attitude still persists to some degree; however, new interactive technologies such as the video disk systems, which allow users to access visual material by use of the computer, are causing some educators to reexamine the computer as a teaching medium. (Home users can also apply this video/computer combination to entertainment purposes.)

Early teaching programs, some of which are still in use, relied heavily on text and simple graphics that were not much more effective than simple printed workbooks. Admittedly, these programs were, and are, *initially* effective, probably because they sparked the excitement of something new. (Such excitement was generated by the short-lived video game craze of a few years ago.) Some educators believe that once the initial rush of enthusiasm subsides, computerized instruction will be equally short-lived, and computers will begin to gather dust in classrooms.

Instructional programs that include pictorials and other more sophisticated graphics seem to have the most potential for growth and survival. The future of this technology lies not so much in the initial "gee whiz" factor, but in the possibility for the inclusion of a broader range of subject matter, which, by its very nature, must include sophisticated visual material.

For example, by using text and computer-generated graphics, it's possible to design a computer program that will teach students to identify works of art, tissue samples or microscope slides. However, given the amount of memory and cost involved in producing the high-resolution images that would be required, such a project is prohibitive.

This type of programming could be more easily accomplished by using the less expensive interactive video disk systems, rather than digital graphics. However, these systems and their software cost in excess of $40,000, an

Photograph by Edward Judice

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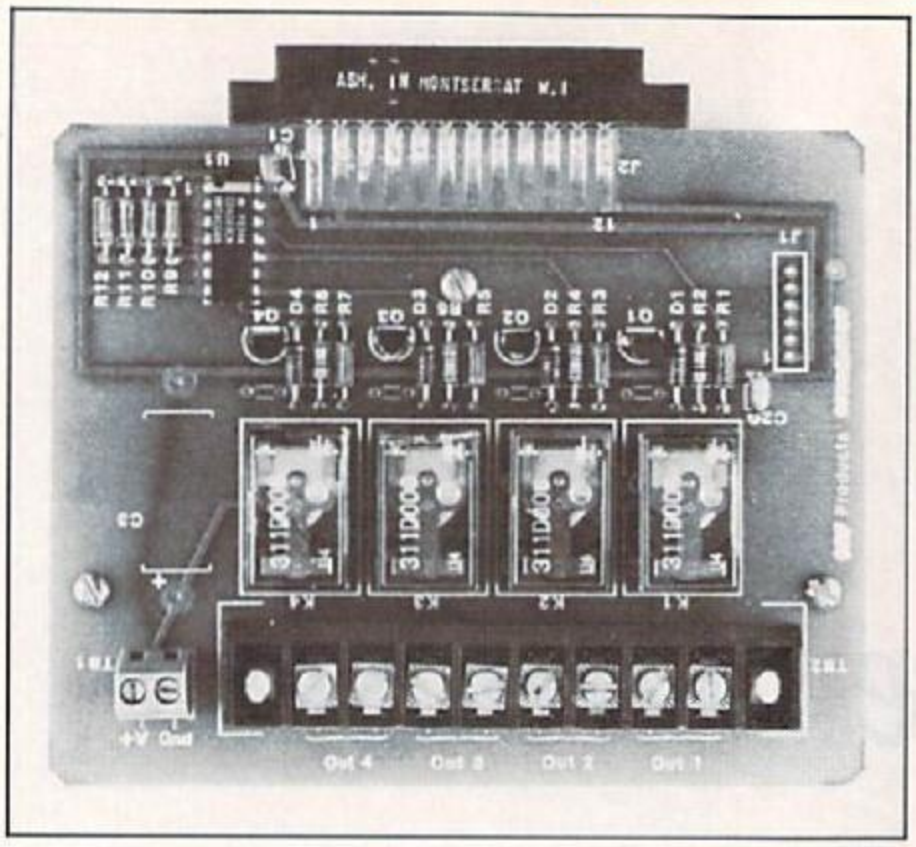

Photo 1. *A four-channel output interface board with four relays.*

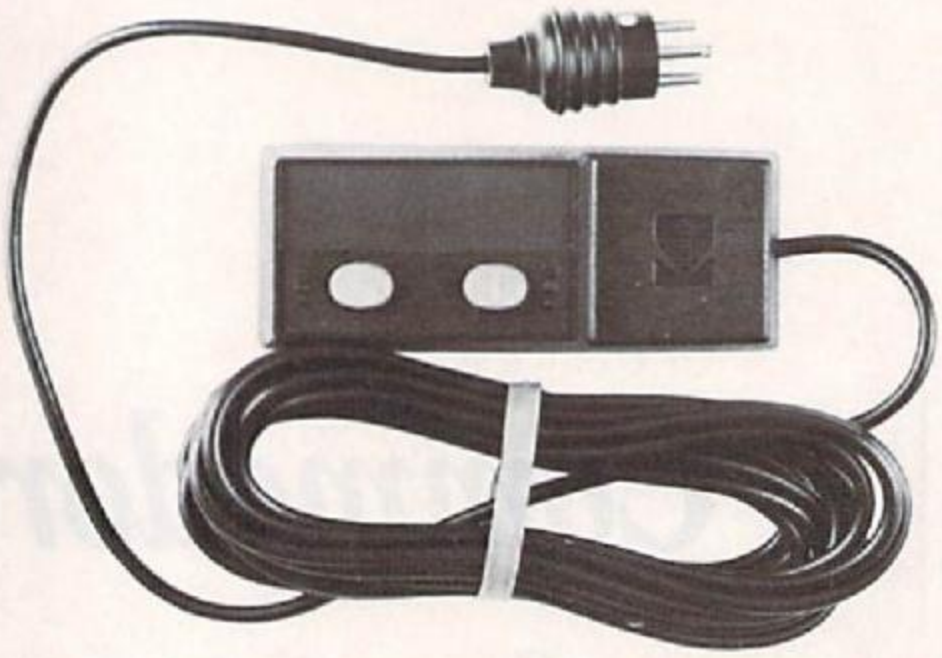

Photo 2. *Original remote slide-advance cord with advance-reverse unit still attached.*

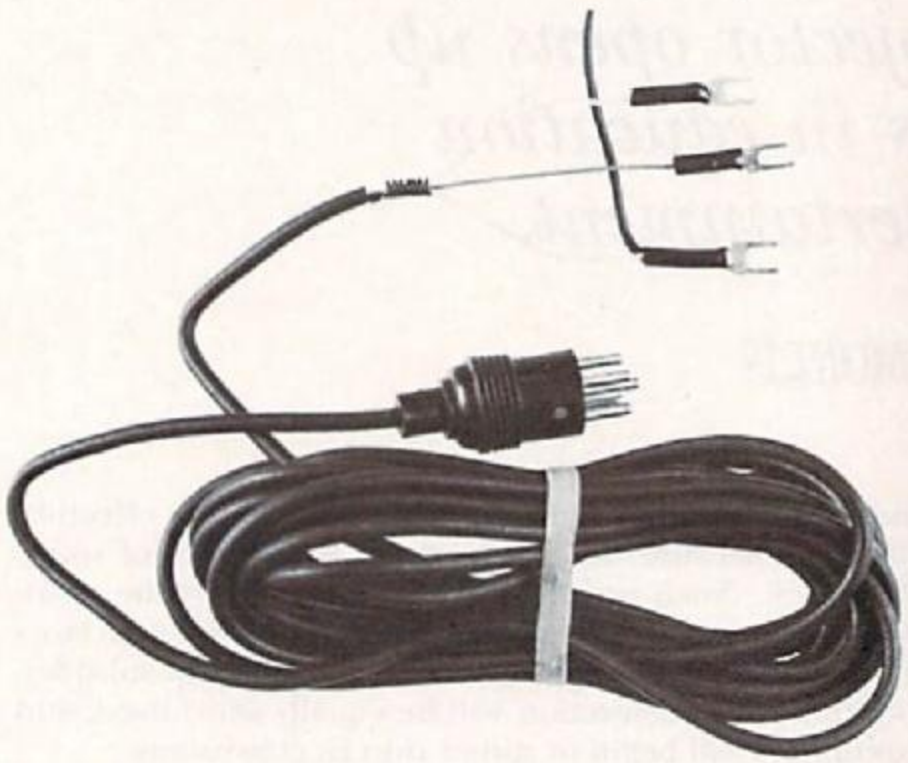

Photo 3. *Remote slide-advance cord with advance-reverse unit removed. (The cord has been prepared to be attached to the output board.)*

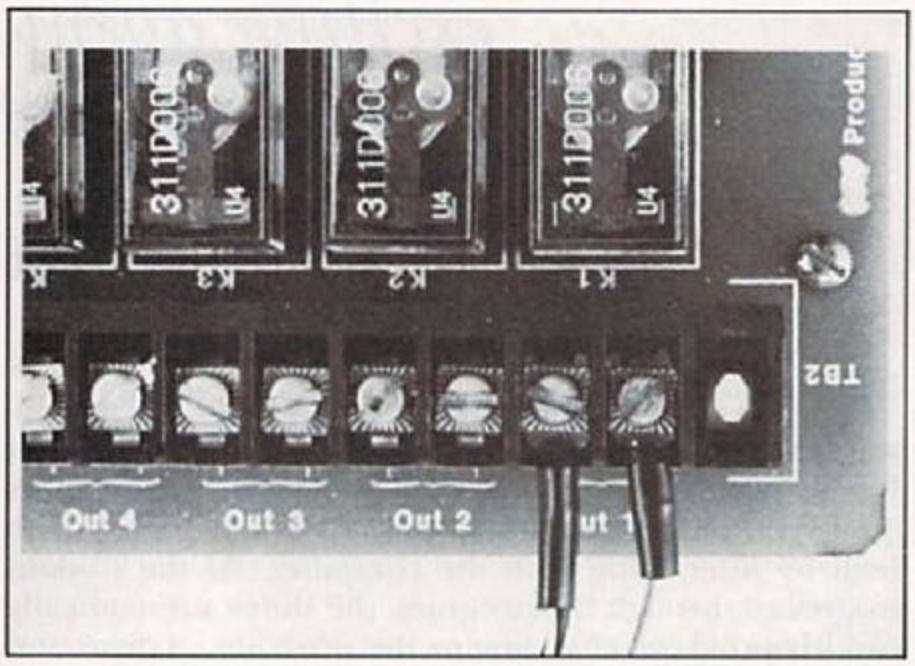

Photo 4. *The advance (left) wire and the return (right) wire (polarity is not important) attached to the output board. (All photos by Daniel Morris.)*

investment that is often beyond the means of small schools and training centers. Given the limited number of students who might benefit from this sort of system, it might be difficult to justify such an expenditure.

The personnel in the schools or corporations who have invested heavily in interactive video disk systems know that the programs for them are expensive. The greatest problem, however, is the difficulty of adapting video systems to individual needs and differences. Only broadly based educational programs that allow for mass marketing are inexpensive enough for appreciable cost effectiveness.

One might hope for an interactive system that is simple and cost efficient, and that satisfies the following needs.

1. It should be relatively inexpensive to put into place.
2. The computer programming should be simple, straightforward and easily modified.
3. The visuals should occupy little memory and be immediately accessible. Waiting for an intricate graphic to load from digital disk memory takes ages.
4. The visuals should be of high resolution, and easy to create and replace. Long hours are required for programming any graphic, even if one uses a graphics tablet.
5. The visuals should be easy to rearrange and update.

All of this and more can be achieved by interfacing an auto-advance slide projector with the computer.

What You'll Need

To do this, I used a C-64 computer, a 1541 disk drive, a 1702 color monitor and a Kodak carousel projector.

I selected this equipment because of its availability, low cost, dependability and simplicity of operation. The C-64's graphics and sound capability made it preferable to some other microcomputers. Another reason for choosing the carousel projector is because its advance mechanism is easily accessed and it is available in nearly any school or training area.

Almost anyone using a 35mm camera can easily create the visual material required for an instructional program.

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With the amount of slide material or number of film strips that can be mounted as slides, the problem of visuals is easily solved. Original slides can be created from art work; non-copyrighted illustrations can be copied; and original photography can be used.

To write an accompanying program is easy in Basic. Most teachers can readily write programs that offer multiple-choice questions mixed with text and a few screen graphics. For example, let's take a look at a possible test program. (Lines 5 and 300 will be explained later.)

```
5 (This line is used to initialize the interface.)
  The first slide is on the projection screen
10 PRINT "{Shift Clear}"
20 PRINT "WHICH OF THE FOLLOWING PAINTED THIS PICTURE?"
30 PRINT "(A) DAVID        (B) INGRES"
40 PRINT "(C) POUSSIN      (D) GROS"
50 PRINT "(E) NONE OF THESE"
60 PRINT "CHOOSE ONE"
70 INPUT A$
80 IF A$ = "C" THEN GOSUB 300
90 IF A$ < > "C" THEN GOSUB 200
200 PRINT "INCORRECT": FOR N = 1 TO 400: NEXT N: GOTO 10
300 (This line contains the subroutine for advancing the projector.)
  The second slide appears on the projector screen.
```

This is, of course, only a simplified example. Actual programs can be far more sophisticated and complex, but the principle is the same. (Some programmers may prefer a Get statement to the Input statement in line 70.)

With the visuals and the programming accomplished, we can take a look at the task of connecting the computer with the projector. This is not nearly as difficult as it may appear. The most difficult work lies in creating the programming.

Preparing for the Connection

For those of you with *RUN*'s 1985 *Special Issue*, p. 8 provides information on various connectors.

For those who have some basic electronics experience, a good book on interfacing should provide the information for constructing a board that can access the eight bits of input/output data that are available through the C-64's user port. To keep it simple, though, commercially constructed input/output boards are available from a number of suppliers who advertise in *RUN*.

Whether the board is a homemade or commercial item, it is the output portion of the board that controls the slide projector. This portion consists of a connector that makes contact with one of the I/O lines at the user port. A conductor carries information from that contact to a transistor. The transistor amplifies the information from the user port, so that it will have enough strength to close a relay. (A relay is an electronically operated switch.)

We now have what is essentially a switch that can be opened and closed by a command from the computer. More importantly, the opening and closing of the switch can be included in a program.

It is a simple matter to connect the projector-advance switching circuit to the board relay (see Photo 1). The remote advance controller that comes with the projector could be used, but I recommend that you use either a spare advance extension cord or an old slide-advance controller. You need to obtain the proper cord and the male connector, which plugs into the projector. Connectors that will fit carousel projectors are available (I get mine from J.T. Simpson, 188 Elizabeth St., New York, NY 10012), but the following procedure is simpler and saves time.

Making the Connection

Making sure that the cord is not plugged into the projector, cut the plastic advance controller off the cord. If an extension cord is used, cut off the female connector (see Photos 2 and 3).

Beginning on the cut end of the cord, strip back the outside covering and find the advance conductor and its return. (The red wire is the advance wire and the yellow wire is the return.)

Connect these two wires to the output relay, so that when the relay closes, they will make a complete circuit (see Photo 4). If a commercially built board is used, you may wish at this time to identify and connect the slide projector's reverse conductor to another relay. The reverse conductor is the remaining white wire.

Now, on to programming the opening and closing of the electronic switch. Line 5 in the sample program contains the commands that are necessary for initialization of the CIA chip—the computer's complex interface adapter. These commands should occur early in the program, since the projector may not advance properly if initialization doesn't occur before an advance is attempted.

The command POKE 56577,255 is used to assure that the I/O lines are off and will not turn on until a command is used to turn them on.

The command POKE 56579,255 is used to designate the I/O lines as output lines.

So, line 5 in the sample program should appear as:

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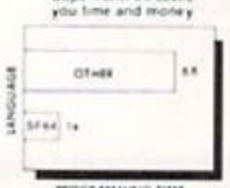

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```
5 POKE 56577,255: POKE 56579,255
```

The only problem in advancing the projector is that the advance button on most projectors must be held down until the projector cycles. That is, the interface relay must be held closed for a short time and then opened. This is accomplished by the use of a For. . .Next loop.

If you assume that the relay is connected to the computer through I/O line PB0, which is pin "C" of the connector, then you can close the relay connected to PB0 with the command, POKE 56577,254.

Remember, you turned off all the output lines with the command, POKE 56577,255. Well, you can use that same command to open the relay.

Line 300, below, is the subroutine for closing the relay, keeping it closed for the cycle of the projector, and then opening the relay.

```
300 POKE 56577,254: FOR N = 1 TO 200: NEXT N: POKE 56577,255:
    RETURN
```

This subroutine can be called up at any point in the computer program where a slide advance is desired.

Final Steps

To set up the system, connect all of the computer components together for normal operation. Then, push the interface board's connector into the user port. (The user port is on the left rear of the computer.)

At this point, you may wish to run the initialization program and the program to close and open the relay. An ohmmeter or continuity tester can be placed across the relay contacts to see if the circuit is closing. If everything is working properly, connect the projector advance cord to the projector and start your program.

All programs should include text that explains the operation of the slide projector. To make sure the images don't get out of synchronization with the text, the number of the slide that is on the projection screen should appear on the computer screen in a second color. This provides a quick reference that allows the operator to rapidly adjust the projector to the correct slide.

Home Entertainment

The computer/slide system is by no means limited to educational uses. Think of the possibilities of a trivia game that uses old movie stills or bubble gum cards. The beauty of this system is that it is limited only by the programmer's imagination.

Other devices such as sound or videotape drives can be similarly interfaced, and For. . .Next loops can be used to allow the tapes to run for specified periods. The advantage of having interactive sound without the loss of memory is similar to the advantage of slide graphics.

Assuming that you already own a C-64 system (a VIC will also support an I/O interface) and a carousel projector, the additional cost should be less than $150. R

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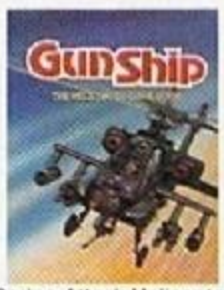

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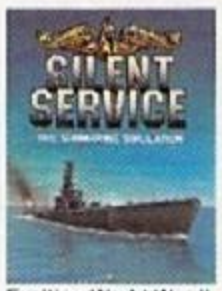

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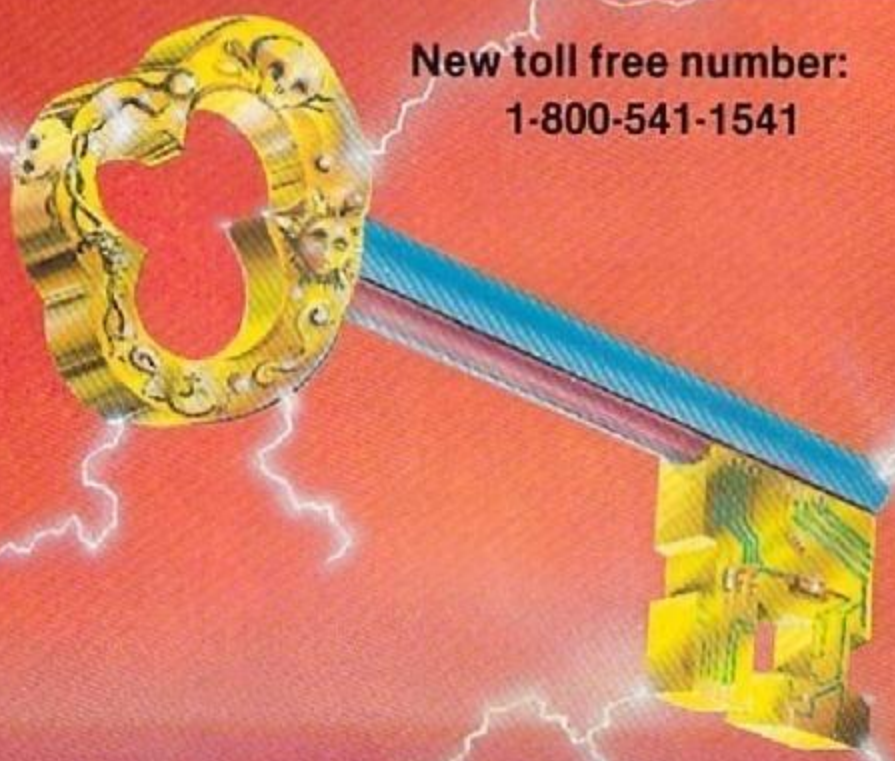

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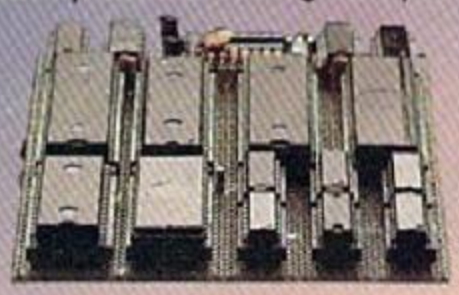

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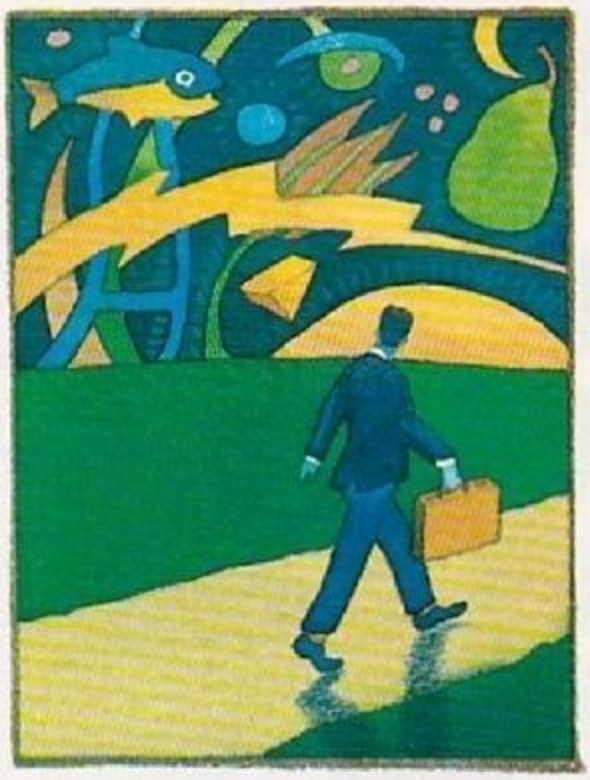
The Creative Computer

This is one man's story of how he used his Commodore creatively. What's yours?

By ANDREW M. COHN



Several hours after the introduction of the home computer, I received a first-hand demonstration from my friend, Richard, who will always be the first on the block to own anything new. He was as proud as a new papa whose offspring could read, write, walk and talk at the moment of birth. I was polite, but not impressed.

Exactly where the right half of my brain was at that time, I do not know, because it took me quite a while to realize how that bucket of bits and bytes, that overpriced slide rule, could be of use to me—a fine arts major whose problem in life was not how to balance a checkbook electronically, but, rather, how to unleash a creativity that clamored for expression. Let me explain...

Ten years ago, when I became media director for a hospital in Washington, DC, I was given the task of producing educational videotapes. By the time I acquired the basic tools of my trade, funds had become very tight. My requests for new production equipment had to compete with requests for medical instruments. I lost.

Making a Wish List

Operating on a restricted budget, I could only fantasize about new ways and means to create videotapes that could add interest and excitement to the process of learning. My growing wish list included:

1. A television title generator. Using rub-on instant lettering took an eternity.

2. A graphics design computer, to create illustrations, graphs and charts—not only for video, but for 35mm slides as well.

3. A speech synthesizer. After all, this is the computer age; why not jazz up the narration with an occasional comment by a computerized voice?

4. A word processor for writing and editing scripts. I'm a fast typist, but I make errors and have a short memory. So why spend five minutes per mistake waiting for the correction fluid to dry and lose my next idea?

5. A music synthesizer. Wouldn't it be nice to create original theme and background music to edit into my videotapes?

In the world of industrial video,

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this is not a cheap wish list. We're talking thousands of dollars here. I saw no point in submitting requests for this stuff!

In the Meantime

So I bided my time, and, before I knew it, the VIC-20 was introduced. At $300, it was a bargain. In spite of my original skepticism, I knew intuitively that this machine would somehow get me out of my rut.

I quickly dumped some of our obsolete audiovisual equipment and raised the money for the VIC, knowing that surely someone would have the software to enlarge the size of the computer's screen text and allow me to use it as a title generator. I was wrong on that count, but a few hundred hours later I became both a programmer and the proud owner of the necessary titling software.

To this day, the sturdy little VIC and its Datassette companion sit at my editing console, ready to provide whatever titles I might need for my videotapes. This brand new capability kept me contented for at least two years. The remainder of my wish list, however, simply would not go away.

Illustration by Katherine Mahoney

And the hospital was still not buying me any expensive new toys.

Granting Your Own Wishes

I knew that to achieve my goals for my work, I would have to purchase my own equipment. While this may sound unusually altruistic, it occurred to me that such an arrangement would permit me to work at home from time to time and avoid the brutal commute. Besides, it was about time a gadget lover like me acquired his own computer. So that is exactly what I did.

Within six months I had accumulated a complete C-64 system plus the essential software to complete my wish list and add some pizzazz to my media productions.

To create original artwork, such as cartoons and illustrations, I chose the KoalaPad with the KoalaPainter software. For video titling, over and above what my VIC-20 can accomplish, I selected Doodle!. This program allows me to display fonts of various sizes and, for charts and graphs, to combine text with graphics.

After the artwork is created and safely stored on disk, I simply carry home a ¾-inch portable videocassette recorder, feed into it the video from the Commodore, and tape a minute or so of each illustration or title set. The next day, the videotape is placed into the editing deck and integrated into the main production. If I need to prepare 35mm slides, I simply photograph the image directly off the computer's monitor.

For me, artifical speech is a novelty that may never wear off. Even without my work projects in mind, I believe that the cost of the computer could be justified by the potential of this amazing capability. The technology still needs refinement, but, with enough patience and phonemes, I have learned to create quite acceptable recordings, which, like the illustrations, are taped and edited into the master videotape. For this item on my wish list, I selected Tronix's S.A.M.

Word processing turned out to be more terrific than I had ever imagined. The addition of a printer and software has made typing, an area that I previously left to others possessing the patience to cope with correction fluid and incessant revisions, much more pleasurable.

Years ago, when I was studying television production in college, I was taught that most musicians do not go through the trouble of scoring a masterpiece for me to copy and incorporate into whatever training film I happen to be producing at the time. As tempting as it might be to open a film with the theme from M*A*S*H, I am deterred by the spectre of incarceration with copyright violators and similar hardened criminals.

Like many folks, I can sort of "play by ear" and pound out an original melody, which can actually fool some of the people some of the time. During my pre-computer years, I did this on a pair of Casio synthesizers in my office. I am now looking into the various music software available for the C-64. I suspect that I will soon be creating my own little masterpiece on the keyboard, in the comfort of my own home. The possibility that Beethoven might shift slightly in his grave is not important here.

What *is* important is that, for a relatively small investment in a home computer, I gained the ability to do exactly what I wanted to do at a fraction of the usual cost.

Unleash Your Creative Spirit

However, should the real point of this story be lost in the maze of gadgets and gimmicks, let me say that what we are really talking about here is not what I do for a living, but, rather, the process of setting free the inventive spirit that wanders aimlessly along the back alleys of our minds.

One need not be an artist, musician or writer to fulfill the fantasy of creation; I derived the most fun from using my speech synthesizer to

send very strange audio tapes to my friends. What's important is the sharing and sense of satisfaction and accomplishment.

For you and me, the home computer—that bucket of bits and bytes—can be the key that unlocks the chains which restrict our thoughts and limit our achievements. R

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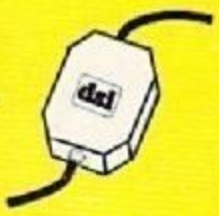

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Pulsing Pictures

By GEORGE TREPAL

Now you can put a little movement into your screen displays by using this low-resolution keyboard graphics animation program.

RUN It Right

C-64; C-128 (in C-64 mode)
Disk drive

Unlike conventional keyboard graphics programs, this program produces movement, so you can have waterfalls, moving belts, wheels, flashing patterns and many other effects. You can also use this program for advertising and making special announcements.

If you haven't used keyboard graphics before, look at your computer's keyboard. Most keys have two little pictures, or graphics, on them. To print a key's left-most graphic, hold down the Commodore logo key (bottom left of keyboard) and press the desired key. To print a key's right-most graphic, hold down the shift key and press the desired key. To change to color, hold down the CTRL key and press the color key (upper row) of your choice. For other colors, press the Commodore logo key and a color key. Key 1 is orange, 2 is brown, 3 is light red, 4 is dark gray, 5 is medium gray, 6 is light green, 7 is light blue and 8 is light gray.

You can combine the little pictures to make drawings, borders and other things. You can also put text on the screen. The very bottom right-hand corner is forbidden territory. If you print a character here, the screen will scroll up and you'll lose the top line of your picture.

When you run the program, the screen will clear. The keyboard graphics work as usual, except for the numbers and some punctuation marks. The program will explain which characters are different when you run it. Pressing any of these altered keys will put a moving character on the screen. These characters can be combined with letters and normal keyboard graphics to produce striking pictures. I won't describe which key does what, since that would ruin the fun of discovery and experimentation.

Here's something to try. Hold down any number key to make a row of moving images. Press the return key to move the cursor to the left margin

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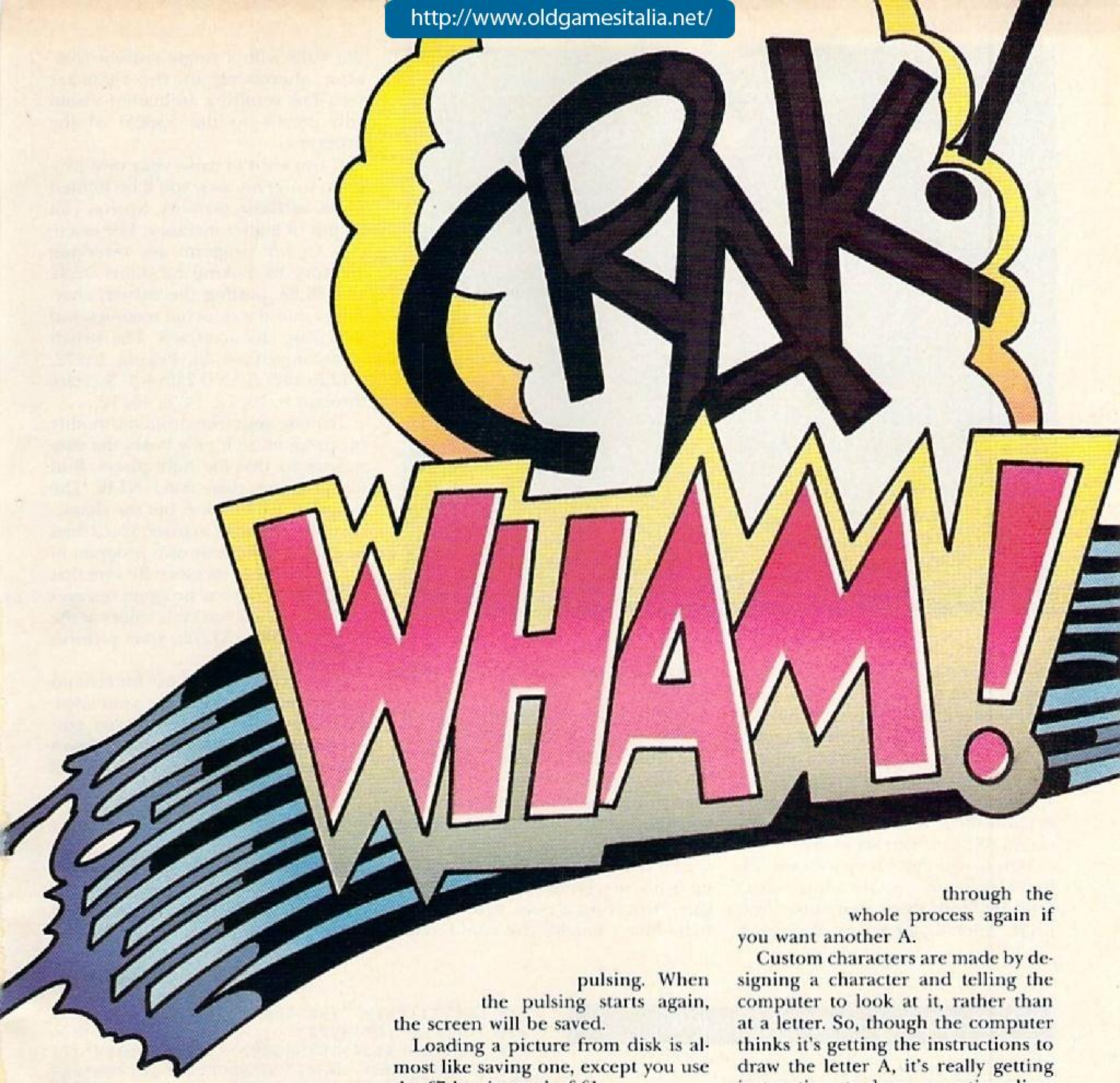

Illustration by Phil Geraci

on the next line. Type your name and press the return key again. Now use another number key to make a bottom row to highlight your name. The English pound key stops the program. Simultaneously pressing the shift and CLR/home keys clears the screen.

To save a screen, press the f1 key, give the computer the name of your picture and press the return key. Any name will work, provided there isn't another picture of the same name on the disk. The disk drive's red light will come on, and the screen will stop pulsing. When the pulsing starts again, the screen will be saved.

Loading a picture from disk is almost like saving one, except you use the f7 key instead of f1.

When saving or loading, you'll lose the character in the upper left-hand corner when the cursor returns to the home position after disk access.

How the Program Works

The program demonstrates a novel use of custom characters. The computer does almost a million things a second, but none of those things amounts to much. Also, in human terms, the computer does things the hard way. For example, to put the letter A on the screen, it has to look up how to make an A. After doing that and drawing the A, the computer forgets what it just did and has to go through the whole process again if you want another A.

Custom characters are made by designing a character and telling the computer to look at it, rather than at a letter. So, though the computer thinks it's getting the instructions to draw the letter A, it's really getting instructions to draw, say, a tiny alien, or whatever you designed.

All of this is controlled by the VIC-II chip, which can look at only 16K of memory at a time. Since a complete character set takes up 2K of memory, there's room for eight complete sets. However, since I've used low memory in this program, there's room for only six sets, since a lot of the Basic operating system and the screen take up the first 4K. I've allotted the next 4K to my program, leaving the last 8K to hold my four character sets.

The program rapidly switches among the four sets, and a different custom character appears on the

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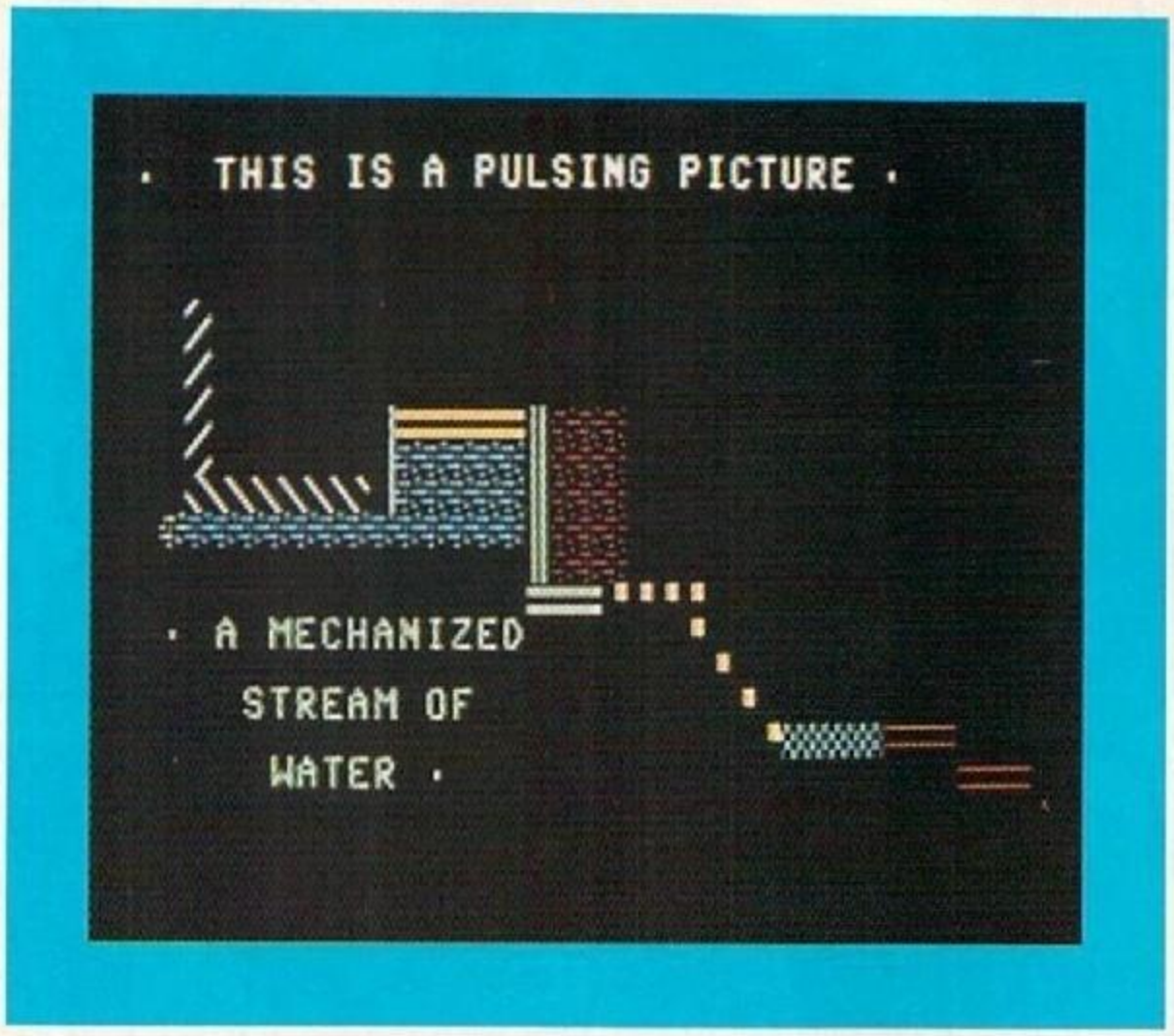

screen with each switch. Like the frames in an animated cartoon, each character is a little different from the last, to achieve the illusion of movement. The non-custom characters are the same in each set, so they don't appear to change. The change itself is controlled by telling memory location 53272 which set to use.

When you run the program, its first task is to copy the entire character set from ROM four times into RAM. After doing this, it Pokes the custom characters into the RAM character sets.

This is a demonstration program, so I've used only 20 custom characters. You could use far more. The advantage to character switching is that you get a lot of animation for very little work. Note that most of the program is taken up by data to make the 20 characters. More of it is taken up with the synthetic cursor. In a game featuring a maze with electric walls (don't touch!) you could make the walls with a single custom character, alternating just two character sets. The resulting animation would add greatly to the appeal of the program.

If you want to make your own program using my sets, you'll be limited to 4K of Basic memory. Sprites can be put in higher memory. The essentials of my program are reserving memory by Poking locations 52,32 and 56,32, putting the custom characters into the reserved memory and switching character sets. The switch is accomplished by Poking 53272, (PEEK(53272) AND 240) + X. X cycles through 8, 10, 12, 14, 8, 10, 12,. . .

To make your own program, modify my program so it only Pokes the data statements into the right places. Run my program, then enter NEW. The program will be gone, but the character sets will remain in place. You'll then be able to write your own program in the empty 4K of memory. Be sure that the first line of your program reserves memory. When you cycle values at the magic address (53272), your pictures will pulse.

If you don't want to use my custom characters, you can make your own. Programmable characters are covered in the *Commodore 64 Programmer's Reference Guide.* R

Address all author correspondence to George Trepal, 2650 Alturas Road, Bartow, FL 33830.

Listing 1. *Pulsing Pictures program.*

```
10Ø REM PULSING PICTURES FOR C-64  :REM*2Ø4
11Ø REM GEORGE TREPAL{3 SPACEs}265Ø ALTURAS
    RD                             :REM*166
12Ø REM BARTOW FL{2 SPACEs}3383Ø   :REM*18Ø
13Ø :                              :REM*1Ø6
14Ø POKE 52,32:POKE56,32:POKE65Ø,128:DIMTS(
    39),TC(39):GOTO56Ø              :REM*4
15Ø REM SYNTHETIC CURSOR           :REM*7Ø
16Ø PRINT"{SHFT CLR}";             :REM*1ØØ
17Ø CD=54272:H=214:L=211           :REM*218
18Ø P=1Ø24+PEEK(H)*4Ø+PEEK(L)+(PEEK(L)>39)*
    4Ø                             :REM*18Ø
19Ø CH=PEEK(P):K=128               :REM*142
2ØØ POKEP,((CH+K)AND255):POKEP+CD,PEEK(646)
                                   :REM*4Ø
21Ø POKE 53272,(PEEK(53272)AND24Ø)+X
                                   :REM*254
22Ø IFZ$="{LB.}"THENPOKE53272,(PEEK(53272)A
    ND24Ø)+4:END                   :REM*26
23Ø X=X+2: IF X=16 THEN X=8        :REM*244
24Ø GETZ$:IFZ$=""THEN2ØØ           :REM*234
25Ø POKEP,CH:PRINTZ$;              :REM*236
26Ø IFZ$=CHR$(34)THENPOKE212,Ø     :REM*211
27Ø IFZ$="{SHFT INST}"THENPOKE216,Ø:REM*217
28Ø IFZ$="{FUNCT 1}"THEN32Ø        :REM*2Ø7
29Ø IFZ$="{FUNCT 7}"THEN45Ø        :REM*119
3ØØ GOTO18Ø                        :REM*1Ø3
31Ø REM SAVE SCREEN                :REM*245
32Ø FORJ=ØTO39:TS(J)=PEEK(1Ø24+J):TC(J)=PEE
    K(55296+J):POKE(1Ø24+J),32:NEXT  :REM*5
33Ø INPUT"{HOME}PROGRAM NAME";PN$  :REM*1Ø5
34Ø IFPN$=""THEN33Ø                 :REM*7
35Ø PN$=PN$+",S,W"                 :REM*239
36Ø FORJ=ØTO39:POKEJ+1Ø24,TS(J):POKE(J+5529
    6),TC(J):NEXT                  :REM*187
37Ø OPEN8,8,8,PN$                  :REM*2Ø5
38Ø GOSUB158Ø                      :REM*165
39Ø FORJ=1Ø24TO2Ø23:VL=PEEK(J):PRINT#8,VL
                                   :REM*83
4ØØ NEXT                           :REM*155
41Ø FORJ=55296TO56295:VL=PEEK(J):PRINT#8,VL
                                   :REM*69
42Ø NEXT:CLOSE8:CLOSE15             :REM*13
43Ø GOTO17Ø                        :REM*217
44Ø REM LOAD SCREEN                 :REM*61
```


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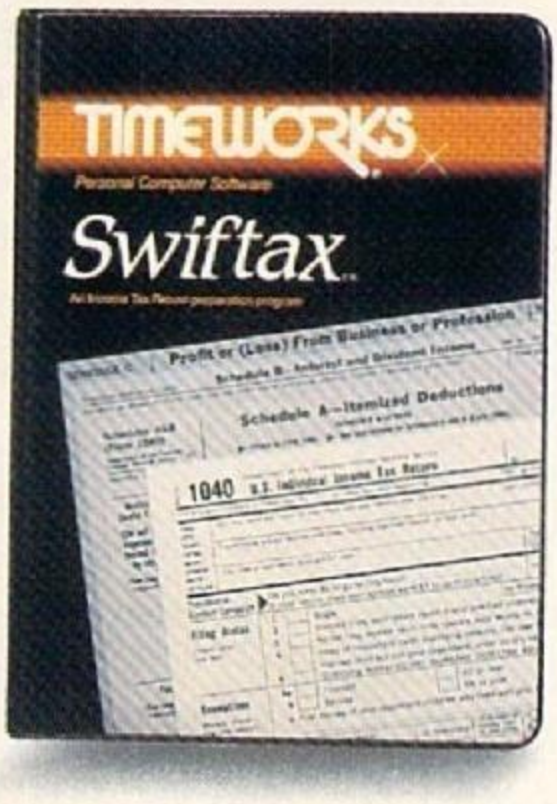

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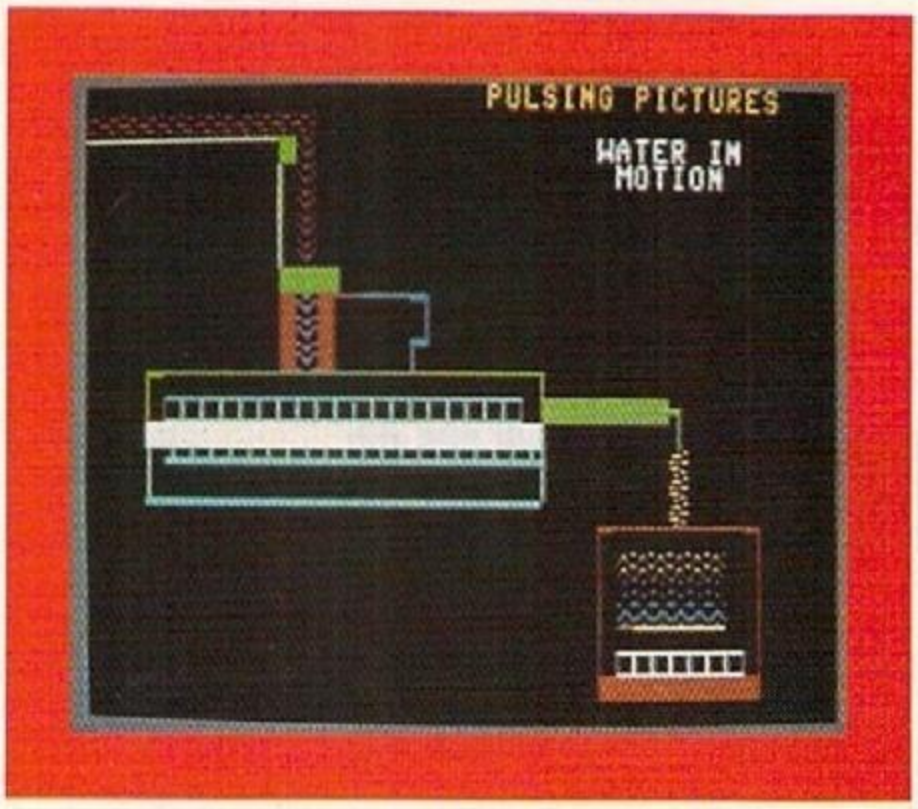

Listing 1 continued.

```
45Ø INPUT"{SHFT CLR}PROGRAM NAME";PN$
                                        :REM*233
46Ø IFPN$=""THEN45Ø                     :REM*147
47Ø PN$=PN$+",S,R"                       :REM*37
48Ø OPEN8,8,8,PN$                        :REM*59
49Ø GOSUB158Ø                            :REM*19
5ØØ FORJ=1Ø24TO2Ø23:INPUT#8,VL:POKEJ,VL
                                        :REM*95
51Ø NEXT                                  :REM*9
52Ø FORJ=55296TO56295:INPUT#8,VL:POKEJ,VL
                                        :REM*62
53Ø NEXT:CLOSE8:CLOSE15                 :REM*124
54Ø GOTO17Ø                             :REM*72
55Ø REM MOVE CHARACTER SET              :REM*1Ø
56Ø POKE 5328Ø,12: POKE 53281,Ø: POKE 646,1
    3                                   :REM*254
57Ø PRINT"{SHFT CLR}":PRINTSPC(12)"{CRSR DN
    }PULSING PICTURES"                  :REM*124
58Ø PRINTSPC(12)"{CRSR DN}BY GEORGE TREPAL"
                                        :REM*182
59Ø PRINTSPC(6)"{2 CRSR DNs}THE CHARACTERS
    THAT MOVE ARE:"                     :REM*4Ø
6ØØ PRINTSPC(9)"UNSHIFTED 1 THROUGH 9"
                                        :REM*216
61Ø PRINTSPC(11)"SHIFTED 6{2 SPACEs}7{2 SPA
    CEs}8{2 SPACEs}9"                   :REM*2Ø8
62Ø PRINTSPC(6)"AND UNSHIFTED ,{2 SPACEs}.{
    2 SPACEs}*{2 SPACEs}+{2 SPACEs}/{2 SPAC
    Es}-"                               :REM*188
63Ø PRINTSPC(6)"{CRSR DN}THE {LB.} SIGN END
    S THE PROGRAM."                     :REM*44
64Ø PRINTSPC(6)"{CRSR DN}F1 SAVES THE SCREE
    N TO DISK"                          :REM*1ØØ
65Ø PRINTSPC(6)"{CRSR DN}F7 LOADS A SCREEN
    FROM DISK"                          :REM*144
66Ø PRINTSPC(6)"{2 CRSR DNs}{COMD 3}{SHFT S
    }{COMD 6}PATIENCE IS A VIRTUE - WAIT"
                                        :REM*34
67Ø PRINTSPC(9)"{CRSR DN}MOVING CHARACTER S
    ETS"                                :REM*92
68Ø J=53248: K=8192: L=1Ø24Ø: M=12288: N=14
    336                                 :REM*9Ø
69Ø POKE56334,PEEK(56334)AND254:REM INTERRU
    PT OFF                              :REM*2Ø2
7ØØ POKE 1,PEEK(1) AND 251: REM I/O OUT
                                        :REM*62
71Ø FORI=ØTO2Ø23:P=PEEK(I+J)            :REM*244
72Ø POKE I+K,P: POKE I+L,P: POKE I+M,P: POK
    E I+N,P                             :REM*2Ø2
73Ø NEXT                                :REM*23Ø
74Ø POKE 1,PEEK(1) OR 4: REM I/O IN :REM*52
75Ø POKE 56334,PEEK(56334) OR 1: REM INTERR
    UPT ON                              :REM*192
76Ø REM INSTALL CUSTOM CHARACTERS       :REM*244
77Ø J=8495                              :REM*183
78Ø PRINTSPC(6)"{CRSR DN}INSTALLING CUSTOM
    CHARACTERS"                         :REM*119
79Ø J=J+1:READ X:IF X<Ø THEN81Ø         :REM*239
8ØØ POKE J,X: GOTO79Ø                    :REM*93
81Ø IF J<1ØØØØ THEN J=1Ø543: GOTO79Ø:REM*33
82Ø IF J<12ØØØ THEN J=12591: GOTO79Ø:REM*45
83Ø IF J<14ØØØ THEN J=14639: GOTO79Ø
                                        :REM*199
84Ø PRINT"{SHFT CLR}{6 CRSR DNs}{2 SPACEs}P
    RESS THE SPACE BAR TO GO ON OR ANY"
                                        :REM*111
85Ø PRINT"{2 SPACEs}OTHER KEY TO CHANGE BAC
    KGROUND COLOR"                      :REM*139
86Ø GETA$:IFA$=""THEN86Ø                 :REM*71
87Ø IFA$<>" "THENPOKE53281,(CLAND15):CL=CL+
    1:GOTO86Ø                           :REM*223
88Ø X=8:GOTO16Ø                         :REM*199
89Ø DATAØ,126,126,96,96,126,126,Ø,24,6Ø
                                        :REM*51
9ØØ DATA1Ø2,195,129,24,6Ø,1Ø2,24,36,66,129
                                        :REM*173
91Ø DATA24,36,66,129,1Ø2,6Ø,24,Ø,195,1Ø2
                                        :REM*1Ø3
92Ø DATA6Ø,24,129,66,36,24,129,66,36,24
                                        :REM*1Ø7
93Ø DATA255,255,Ø,Ø,Ø,255,255,Ø,255,Ø
                                        :REM*13
94Ø DATAØ,Ø,255,Ø,Ø,Ø,255,255,Ø,Ø       :REM*167
95Ø DATAØ,255,255,Ø,255,Ø,Ø,Ø,255,Ø:REM*2Ø1
96Ø DATAØ,Ø,255,129,129,129,129,129,129,255
                                        :REM*135
97Ø DATAØ,Ø,Ø,24,24,Ø,Ø,Ø,192,129        :REM*7
98Ø DATA3,6,12,24,48,96,3,129,192,96
                                        :REM*135
99Ø DATA48,24,12,6,192,192,192,192,192,192
                                        :REM*91
1ØØØ DATA192,192,3,3,3,3,3,3,3,3        :REM*243
1Ø1Ø DATA255,255,Ø,Ø,Ø,Ø,255,255,195,195
                                        :REM*189
1Ø2Ø DATA195,195,195,195,195,195,135,36,48,
    4                                   :REM*179
1Ø3Ø DATA1Ø8,1Ø4,Ø,49,Ø,Ø,Ø,Ø,15,15 :REM*72
1Ø4Ø DATA15,15,2Ø4,2Ø4,51,51,2Ø4,2Ø4,51,51
                                        :REM*218
1Ø5Ø DATA -1                            :REM*17Ø
1Ø6Ø DATAØ,126,126,1Ø2,1Ø2,1Ø2,1Ø2,Ø,6Ø,1Ø2
                                        :REM*14
1Ø7Ø DATA195,129,24,6Ø,1Ø2,195,36,66,129,24
                                        :REM*114
1Ø8Ø DATA36,66,129,24,195,1Ø2,6Ø,24,Ø,195
                                        :REM*15Ø
1Ø9Ø DATA1Ø2,6Ø,24,129,66,36,24,129,66,36
                                        :REM*84
11ØØ DATA255,Ø,Ø,Ø,255,255,Ø,Ø,Ø,Ø :REM*116
111Ø DATAØ,255,Ø,Ø,Ø,255,Ø,255,255,Ø:REM*3Ø
112Ø DATAØ,Ø,255,255,Ø,255,Ø,Ø,Ø,255
                                        :REM*164
113Ø DATAØ,Ø,Ø,126,66,66,66,66,126,Ø
                                        :REM*134
114Ø DATAØ,Ø,6Ø,36,36,6Ø,Ø,Ø,3,6       :REM*152
115Ø DATA12,24,48,96,193,131,192,96,48,24
                                        :REM*162
116Ø DATA12,6,131,193,48,48,48,48,48,48
                                        :REM*248
117Ø DATA48,48,12,12,12,12,12,12,12,12
                                        :REM*122
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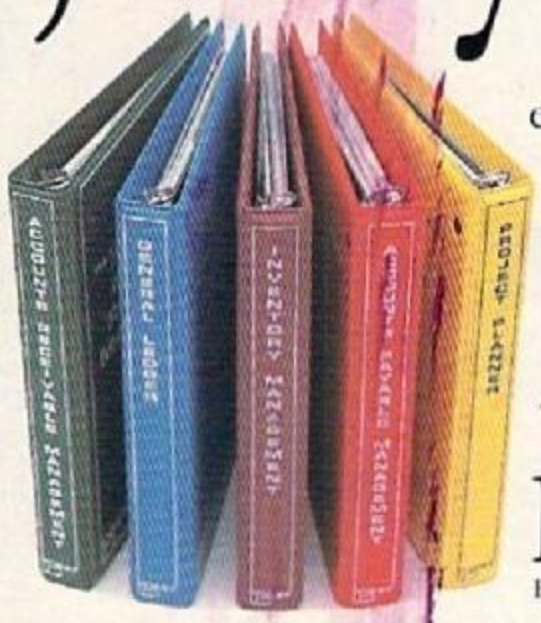

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Listing 1 continued.

```
1180 DATA0,255,255,0,0,255,255,0,102,102
                                        :REM*96
1190 DATA102,102,102,102,102,102,192,196,28
     ,80                                :REM*12
1200 DATA0,103,37,32,0,0,0,0,240,240:REM*12
1210 DATA240,240,102,102,153,153,102,102,15
     3,153                              :REM*66
1220 DATA -1                            :REM*84
1230 DATA0,126,126,6,6,126,126,0,102,195
                                        :REM*154
1240 DATA0,24,60,102,195,24,66,129,24,36
                                        :REM*156
1250 DATA66,129,24,36,24,195,102,60,24,0
                                        :REM*34
1260 DATA195,102,36,24,129,66,36,24,129,66
                                        :REM*78
1270 DATA0,0,0,255,255,0,0,0,0,0    :REM*170
1280 DATA255,0,0,0,255,0,0,255,255,0
                                        :REM*245
1290 DATA0,0,0,255,0,0,255,0,0,0     :REM*11
1300 DATA255,0,0,0,60,36,36,60,0,0  :REM*119
1310 DATA0,126,66,66,66,66,126,0,12,24
                                        :REM*37
1320 DATA48,96,192,129,3,6,48,24,12,6
                                        :REM*209
1330 DATA3,129,192,96,12,12,12,12,12,12
                                        :REM*73
1340 DATA12,12,48,48,48,48,48,48,48,48
                                        :REM*233
1350 DATA0,0,0,255,255,0,0,0,24,24  :REM*103
1360 DATA24,24,24,24,24,24,0,143,160,162
                                        :REM*213
1370 DATA2,42,200,3,240,240,240,240,0,0
                                        :REM*237
1380 DATA0,0,51,51,204,204,51,51,204,204
                                        :REM*91
1390 DATA -1                            :REM*255
1400 DATA0,102,102,102,102,126,126,0,195,0
                                        :REM*195
1410 DATA24,60,102,195,24,60,129,24,36,66
                                        :REM*31
1420 DATA129,24,36,66,60,24,195,102,60,24
                                        :REM*223
1430 DATA0,195,66,36,152,129,66,36,24,129
                                        :REM*101
1440 DATA0,0,255,255,0,0,0,255,0,255
                                        :REM*153
1450 DATA0,0,0,255,0,0,0,0,255,255  :REM*225
1460 DATA0,0,0,0,0,0,0,255,0,0      :REM*217
1470 DATA0,255,0,0,0,24,24,0,0,0     :REM*93
1480 DATA255,129,129,129,129,129,129,255,48
     ,96                                :REM*93
1490 DATA192,129,3,6,12,24,12,6,3,129
                                        :REM*233
1500 DATA192,96,48,24,3,3,3,3,3,3   :REM*245
1510 DATA3,3,192,192,192,192,192,192,192,19
     2                                  :REM*19
1520 DATA0,255,255,0,0,255,255,0,54,54
                                        :REM*133
1530 DATA54,54,54,54,54,54,3,121,0,215
                                        :REM*179
1540 DATA16,244,6,48,15,15,15,15,0,0
                                        :REM*198
1550 DATA0,0,102,102,153,153,102,102,153,15
     3                                  :REM*76
1560 DATA -1                           :REM*170
1570 REM ERROR TRAP                    :REM*126
1580 OPEN15,8,15                       :REM*212
1590 INPUT#15,E,E$                     :REM*168
1600 IFE=0THENRETURN                     :REM*2
1610 PRINTE,E$:CLOSE8:CLOSE15:END    :REM*248
```

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Telecomm

BRS/After Dark and The Knowledge Index

By MARGARET MORABITO and CHRISTINE ADAMEC

When it comes to information services, Americans are one of the most active groups of consumers in the world. The amounts of information available today and the large number of people seeking information for daily needs have led us to a point where information exchange has become a necessary component of our vocations and even our personal lives. We need information in order to make decisions, plan, write reports, and otherwise to be "in the know," and we need it fast.

For several reasons, telecommunications is contributing to rapid growth in this type of consumerism. The on-line information networks can hold massive amounts of varied information in one central location. We don't have to physically move from library to library or wait for inter-library loans to come through.

This centralization of information is compounded with another aspect of telecommunications—speed. Using an on-line network that has sophisticated search features, you can now accomplish in a few hours what used to take up to four or five days to research.

Both of these aspects of telecommunications combine to benefit the professional, the home user and the student by saving time and money, and providing access to much more information than any local library can hold.

Do you have a term paper due tomorrow and can't get to the library? Or maybe you haven't researched that article or report as thoroughly as you could have. These two bibliographic on-line services offer a vast source of information, without a lot of legwork or book-toting.

On-line databases that provide specialized information normally found in libraries and professional research facilities are known as bibliographic services. These services can provide full-text versions of articles from a variety of sources; abstracts (summaries) of books, magazine articles, conference reports, case rulings, etc.; indexes of all materials written about certain topics; and more.

There are hundreds of these databases available to you if you have a computer and a modem. Some of them are directed towards universities, businesses and large professional applications. BRS and DIALOG are two massive networks providing bibliographic information services for large-scale users.

There are also smaller bibliographic networks tailored for the less frequent user, such as the home or professional user, the small-businessperson or student. This month, we will look at two such bibliographic networks: BRS/After Dark and The Knowledge Index. Both of these networks are offsprings of their larger parent companies, namely, BRS and DIALOG.

Let's start off with a look at BRS/After Dark.

BRS/After Dark

BRS/After Dark is an outstanding and easy-to-use computerized search service based in Latham, New York. Providing literally millions of citations from medical, business, social service and other types of information, BRS/After Dark is comprehensive and fun to use, whether you're a student, doctor, businessperson or anyone who needs information. (BRS stands for Bibliographic Retrieval Service.)

Since March of 1982, BRS/After Dark has offered its services to educators, doctors, businesspeople, researchers and the just plain curious.

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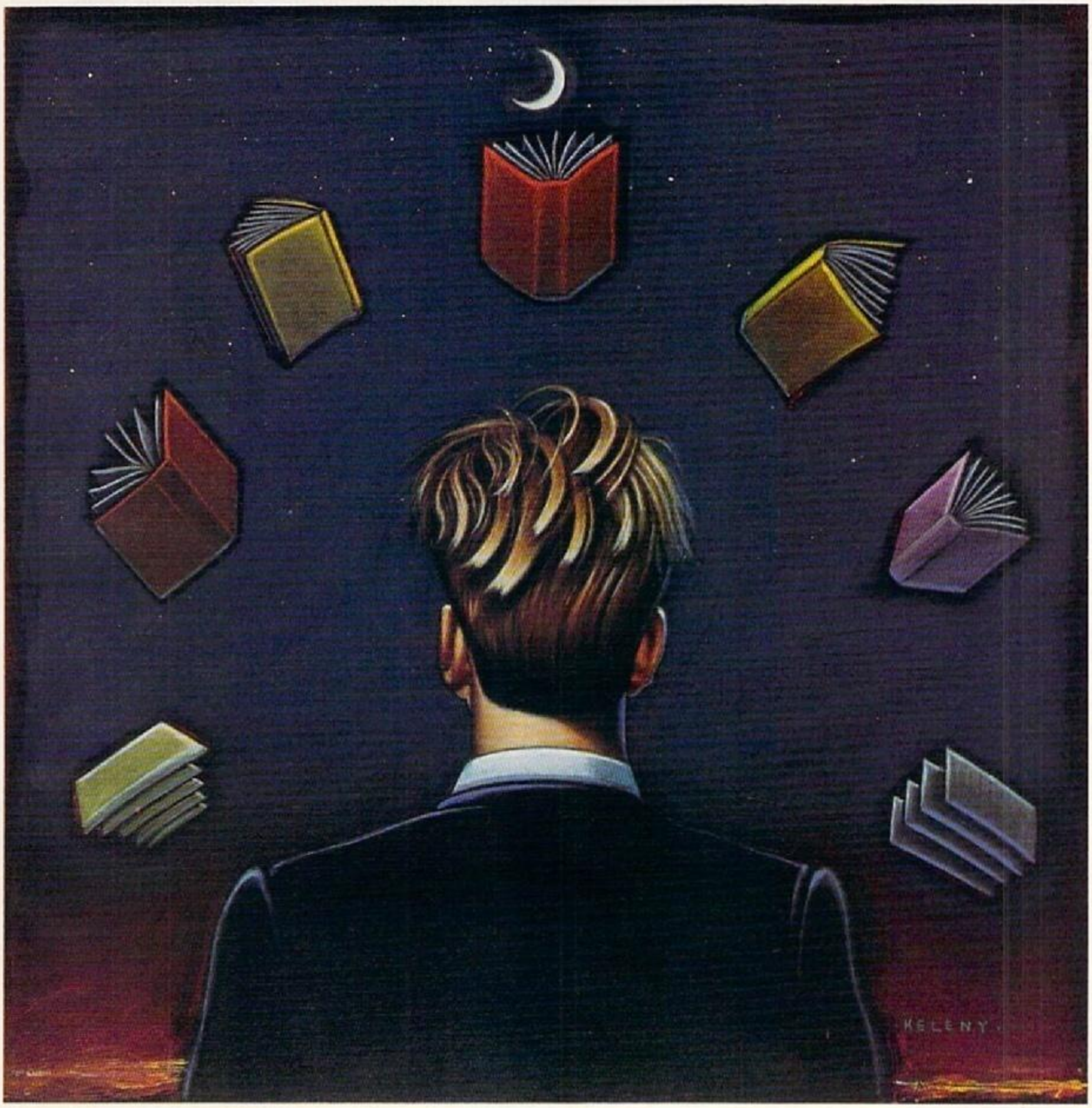

Illustration by Earl Kelleny

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Today this search service provides over 60 databases, ranging from the Harvard Business Review to the American Psychological Association to U.S. Books in Print and many others. (It's adding a Legal Resource Index, a Magazine Index, a National Newspaper Index and more.)

The service is called "After Dark" because of the hours during which you can search. (BRS—without the "After Dark"—is available during the day, but at about triple the price.) Users can access BRS/After Dark on Monday–Friday from 6 PM until 3 AM (Eastern Time), Saturdays from 6 AM until 4 AM and Sundays from 6 AM until 2 PM and 7 PM until 4 AM.

To use this service, you need only your computer, any 300- or 1200-baud modem and modem software. (I use the Westridge modem and software for my C-64.) I also recommend a printer, so you can save your information on pages.

New BRS/After Dark users pay a one-time sign-up fee of $75, and a minimum monthly charge of $12. You're charged an on-line fee of $6 per hour, and each database has its own hourly charge—for example, the Books in Print database charges $14 per hour.

The Education Resource Information Center (ERIC) database costs $6 per hour (the lowest hourly charge), and the International Pharmaceutical Abstracts database costs $25. (Most databases run around $10–$15 per hour.)

You're charged by the minute, not by the whole hour, and even a novice can whip through a search in faster than 60 minutes. Your bill is charged to your American Express, Master Card or Visa account, and BRS/After Dark sends you monthly statements.

Searches are easy to perform—you can be a first-timer and handle this system. (No fancy courses are required to break mysterious codes—everything is very up-front. And BRS also provides a toll-free customer service number.)

Using BRS/After Dark

After you've signed up as a subscriber, you'll receive a very clear manual and your passwords. To access BRS, you'll dial a local phone number, then type in your passwords. BRS will ask you for your computer screen's line length and width length (I use 40 and 25 for my C-64) and then show you the menu.

"Looking for Info?" is the option you'll select to perform a search. (You can also learn about new additions or change your password, if you so desire.)

Next, you're asked which category you'd like to search. Offerings as of September 1985 included science and medicine, business and finance, reference, education or social science/humanities.

If you've opted for "business," then you're given another menu. As of this writing, the service offers eight different business databases, from ABI/Inform (produced by Data Courier, Inc., this database covers business and management periodicals worldwide—updated to the current month—for a $15 hourly rate) to Business Software Data, Patent Data and other selections.

Let's say you want ABI/Inform. That code word is INFO. The computer then asks if you'd like prompts for the code words. If you're a beginner, you'll want to see these prompts, since they explain that "S" is for "Search," "P" is for "Print," "M" is for "Menu," etc.

You will also be asked if you'd like a description of the database. If you do, you'll receive a short description of who provides the service, what they cover, cost, and so on.

You really should plan your search before ever turning on the computer. (Time is money!) Performing a search entails typing in a series of keywords. The computer searches its database for these keywords, and, within seconds, reports back on how many places it found your subject covered. Obviously, if you come up with some huge number of documents, you'll want to narrow your search.

For example, I used the INFO database, and the keyword "computer." I was told that there were 15,262 documents available. Then I used "1985 and computers" and received 1591 hits. Still too many. Then I typed "Commodore 64 and 1985," and learned there were three documents. So I ordered a printout.

The system asks you whether you want a short, medium or long citation. If you've received 45 hits and you're curious about them all, you might pick the short option. That way, you can see whether they're worth scanning at length later. (But with just three, you might as well go with the long option, which provides you with abstracts of about 250 words.)

You'll learn as you go along. For example, I once wanted to search how weather affected people's behavior, using several social science databases. Therefore, I typed in "weather and behavior," and the system informed me there were 20 documents available.

After ordering a printout, however, I found that almost all the information involved how weather affected insects, cows and other creatures—people were barely mentioned! Since I rapidly realized my mistake, I pressed Q, ordering the computer to quit printing, and changed my search to "human behavior and weather." This time I received mention of fewer documents, but they answered my needs.

You can also search a field according to the names of its various experts. For instance, I once used as a keyword "Seymour Papert," a renowned computer expert; one database failed to find him, but another yielded exactly what I needed.

Keep Informed

BRS/After Dark is fun and much less expensive than what private search companies will charge you. (I speak from experience!) The scope of information is very comprehensive. For example, last night I performed searches on such varying topics as trade shows, color separation and open adoption, and I found highly useful information on all three.

The service is ideal for colleges, high schools, entrepreneurs and many other groups of information addicts. Decide for yourself if this search service could optimize your own information needs. (BRS/After Dark, 1200 Route 7, Latham, NY 12110; 800-2-ASKBRS.)

The Knowledge Index

Another bibliographic network available to home users is The Knowledge Index. Like BRS/After Dark, The Knowledge Index is offered to home users during the nighttime hours. It was created by DIALOG Information Retrieval Service specifically as a service for computer owners who need to gather data about a specific topic and would most likely be working from their homes rather than from their offices.

The Knowledge Index holds about 25 databases, all of which are also available on DIALOG. The Knowledge Index provides quick and easy search methods, and you aren't over-

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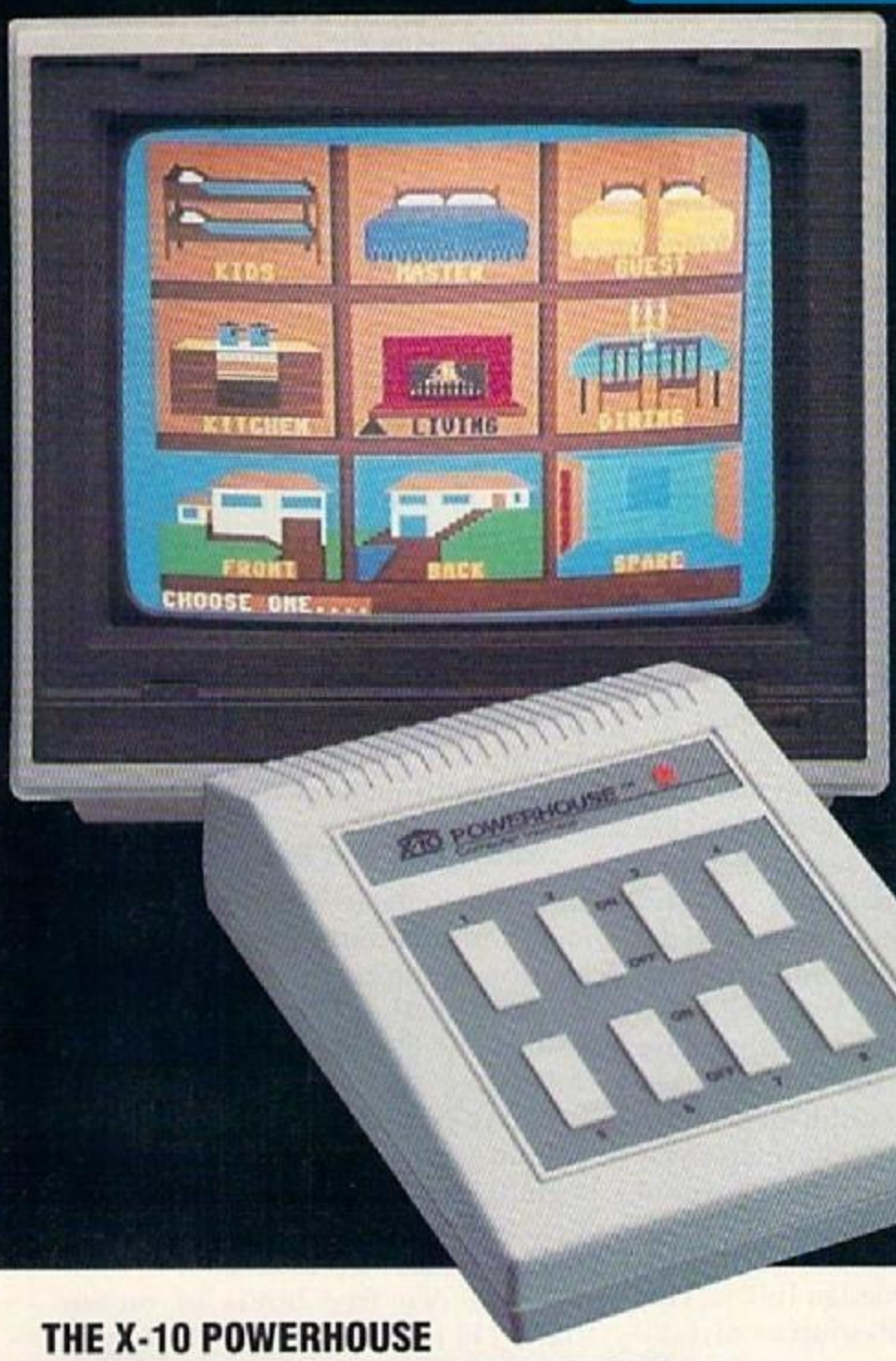

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powered or confused by highly complicated search features that often accompany the larger bibliographic networks. If you need to find certain information, you can log on to this network and quickly find it.

For example, if you wanted to know all of the magazines that specifically cover the C-64 computer, you could search through the Magazine Index using keywords such as "Commodore" and "home computers." You would be told how many magazines deal with Commodore home computers, then you would be given their names and all pertinent information. The Magazine Index covers such topics as current events, recreation, travel, business, science, technology, consumer product reviews, sports, art and more.

If you needed to find out who published a particular book that you are trying to locate for a research paper, you could search the Books in Print database. This would give you the title, author, publisher and other details about that book. You could also locate other related books that have been published in the U.S. and any that are going to be published within the next six months. There are over 14,000 U.S. book publishers covered in this database.

Educators and students will find ERIC on The Knowledge Index. This database includes Resources in Education, which covers noteworthy educational research projects and reports, and the Current Index to Journals in Education, which is an index of more than 700 educational periodicals.

Legal professionals or people wanting to learn about law can access The Legal Resource Index on this network. This database provides over 700 legal periodicals, five law newspapers, legal publications on specific topics and government publications from the Library of Congress.

For medical information, Medline offers indexed articles from over 3000 international journals covering biomedical topics, and cites about 600,000 references to articles that have been written and published in these journals.

Furthermore, there is the Biosis Previews and Backfile database. This covers the areas of biology, medicine and interdisciplinary life sciences and provides citations from Biological Abstracts and Biological Abstracts/RRM.

If you are interested in finding out what software is commercially available for your computer, you can access the International Software Database. The information within this database is gathered from computer journals worldwide. Records contain two- or three-line descriptions of the software items. Each item is tagged with the names of compatible computers. Purchase price and suppliers' names and addresses are included.

To give you an idea of the breadth of coverage on The Knowledge Index, some of the subject areas covered include agriculture, books, business, computers, electronics, corporate news, education, engineering, government publications, legal research, magazines, medicine, news and psychology. Within each subject area, you may find two to three major databases, providing information that totals over five million references and abstracts available throughout the network.

Subscription and Rates Info

To subscribe to The Knowledge Index, you can contact DIALOG Information Services, Inc., 3460 Hillview Ave., Palo Alto, CA 94304. Or, you can phone 800-528-6050 to order information about the network.

There is a $24 per hour (40 cents/minute) on-line charge and a $35 sign-up fee for The Knowledge Index. When you sign up, you get a password, an instructional user manual and two free hours of on-line time. There is no monthly minimum charge.

The hourly charges on a network like this are slightly higher than the general-interest networks because of the highly specialized information offered as well as the high-speed search features, which save you time and money.

When you look at this hourly cost in perspective, you will see a large saving in effort and money, especially if you live in a rural area. Rather than driving 80 miles to a large city university library that holds the articles that you need, you can log on and get your own copies of them.

Next month, we'll take a look at several databases available for those people wanting information and advice about medical questions. R

Christine Adamec (1921 Ohio St., Palm Bay, FL 32907) wrote the BRS/After Dark review.

Margaret Morabito (c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458) wrote the introduction and The Knowledge Index review.*

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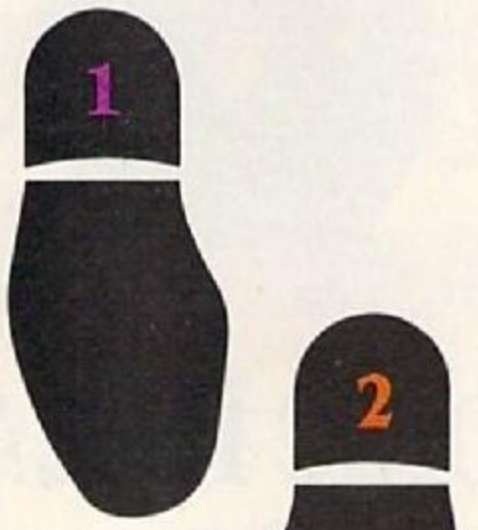

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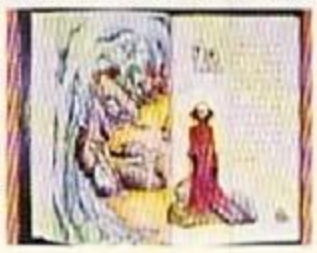

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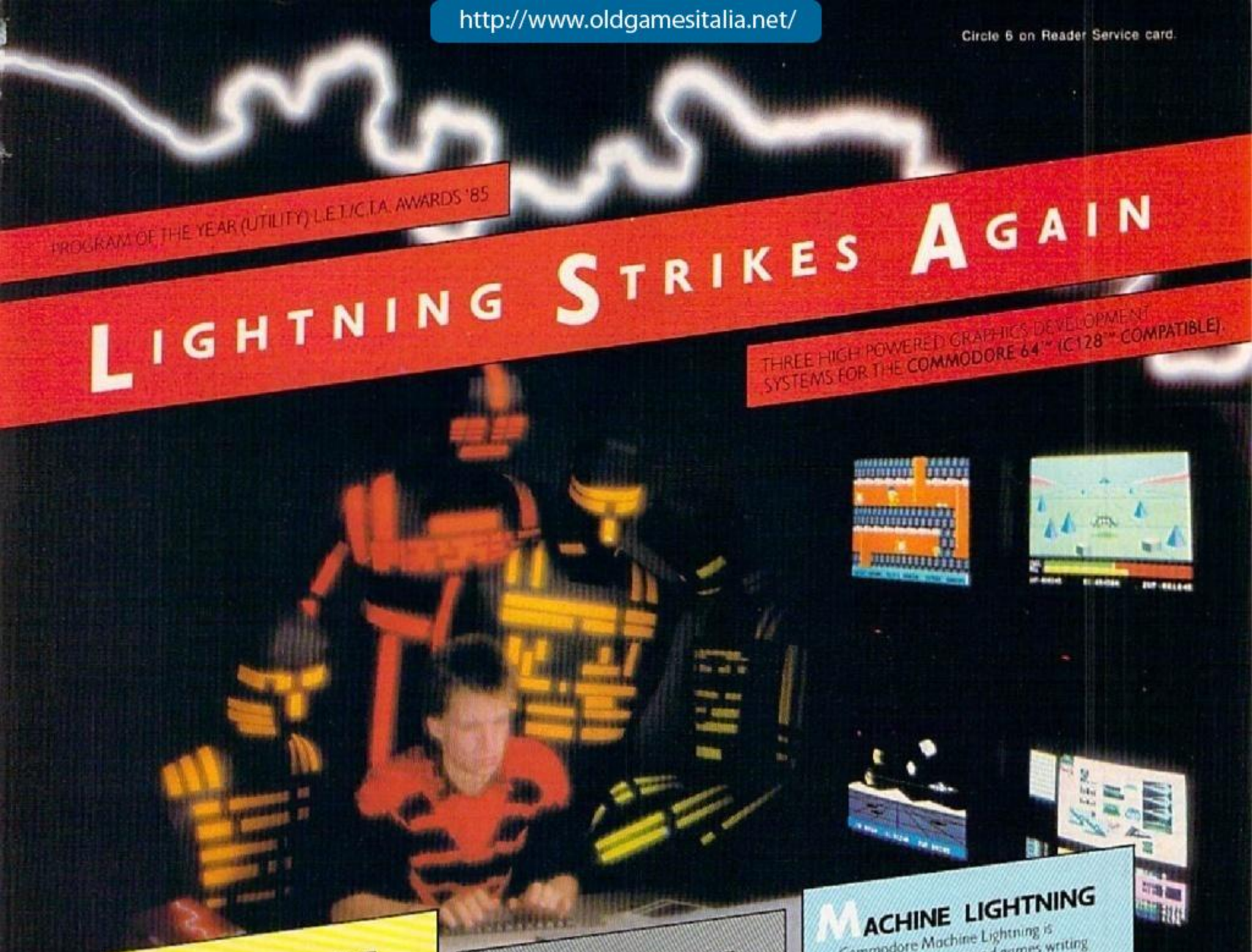

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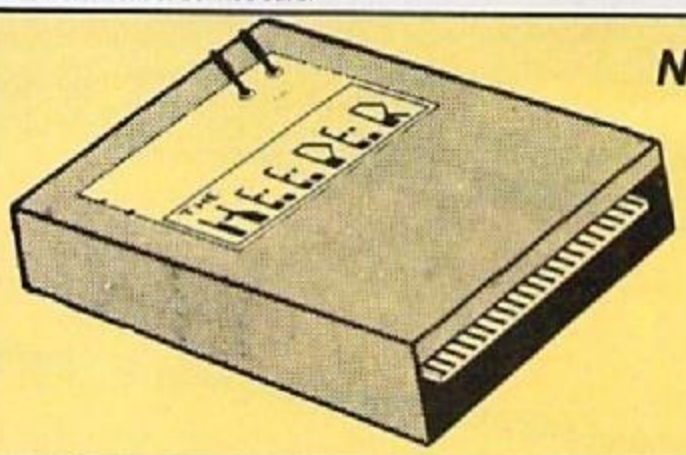

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Programed by Jim Drew

MAGNUM LOAD is a new replacement KERNAL (operating system) ROM chip for your Commodor 65 or 128 computer that will load and verify programs up to 6 times faster than before. The tape routines have been removed from the old chip and in their place have been put a high-speed loader, high-speed verify, and disk driver no-head-rattle routine. Unlike the older cartridge fast loaders, no ports are tied up at the rear of the computer, the screen is not blanked during loading and there is no wear-and-tear on the expansion port. For maximum convenience and performance, the chip is installed directly in the circuit board. Generally a socket has already been provided to make the operation easy, but occasionally some soldering may be required. Now you can give your 1541 disk drive "1571 speed."

Rather than give you more exagerated claims about how many times faster our ROM chip is compared to the slower cartridge versions, a comparison chart is supplied listing MEASURED loading times.

Program	Star-Dos	Reg. Load	Mach 5	Fast Load	MAGNUM LOAD
Pitstop II	?	144 sec.	43 sec.	41 sec.	**31 sec.**
Music Shop	?	105 sec.	105 sec.*	105*	**21 sec.**
Hitchhiker's Guide to the Galaxy	?	70 sec.	70 sec.*	N.G.**	**68 sec.**
On-field Football	?	149 sec.	66 sec.	63 sec.	**56 sec.**
EASY FINANCE I	?	58 sec.	13 sec.	13 sec.	**11 sec.**

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*Will not fast load - defaulted back to regular load

**Failed to load at all

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Programed by Jim Drew

Are both collections of 20 programs per diskette (that works out to about $1.00 per program!) that help you explore and enhance your Commodore 64 and/or 128 and 1541 disk drive. Now you can unlock many secrets formerly known only to top machine language programmers by using these sophisticated "tools." If you have ever been curious about the inner workings of your computer system, now is your chance to dig in and find answers with the help of these programs. These collections of programs have gotten rave reviews from actual users, and we are sure that you, too, will be pleased.

The programs include on each diskette are listed below

TOP SECRET STUFF I

The Dock (view/repair disk contents)
Sync Checker (diskette)
Imbedded Track Number Creator
Disk Manipulation System
3 Minute Copy (backup program)
Diskette Matcher (compare sectors)
Unscratch A File (recover file)
View BAM (block allocation map)
1541 Read/Write Test
½ Track Reader
Header Reader (display disk header)
Sync Maker
Device Number Change (disk drive)
Electronic Arts Backup
Drive Mon (disk drive m/l monitor)
Diskette File Log (start-end address)
Write-Protect Sensor Test
Repair A Track (recover data)
Fast Format (10 seconds)
½ Track Formatter

TOP SECRET STUFF II

RAM Test (test Computer RAM)
Copy $A000-$FFFF (under ROMS)
Display G.C.R. (All sector data)
Un-Write Protect (diskette)
Unnew Program
Wedge - $8000
Smooth Scroll (messages up screen)
Koala Dump (koala pad screen dump)
Disk Manipulation System
Disk Eraser (20 second clean wipe)
Split Screen (TWO screen colors)
Disk Protection System (stops copies)
Write Protect (diskette)
Boot Maker (autobook BASIC programs)
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Plus the only BBS with all three (3) proticals X modem, new printer and midwest term, so anyone can up/down load.

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CP/M Treasure Trove

Discover a bounteous supply of almost free CP/M programs that you can use on your new C-128. This article reveals the secret of where to call or write.

By CHERYL PETERSON

One nice feature of CP/M-compatible computers is that a CP/M program developed for one computer will usually run on another, unless the program contains system-specific functions.

This spells good news for C-128 owners, because now you can run Osborne or Epson programs, for example, on your C-128. But an even bigger supply of software exists for the 128 owner, if you only know where to look.

Called public domain software, it is uncopyrighted and freely available through user groups and electronic bulletin boards. If you have a modem and terminal software, some of it can be had for the price of the disk to save it on and maybe a telephone call. Some is available for a yearly membership fee in a user group and a small charge to cover disk price and copying. For those who don't mind paying CompuServe connect charges, much of this software can be found in the data libraries of the CP/M SIG.

This article includes lists of some places to look for all this "free" software; but first, let's take a look at the types of groups who give it away.

User Groups

There are several national user groups that maintain a public domain software library. SIG/M (Special Interest Group for Microcomputers) is one of the largest in the world. Headquartered in Iselin, NJ, SIG/M has regional offices throughout the United States and the world.

Since SIG/M suggests that you contact a local representative to buy the software offered on disk, this article includes a listing of local contacts. You can purchase a catalog listing the software currently available in the library by sending $3 to SIG/M (see address in Table 1). The disk numbered 00 in the library contains the full catalog in electronically readable form.

Although SIG/M software is usually distributed on 8-inch disks that cost $6, many SIG/M groups can provide the disks in 5¼-inch format, if requested. Check with your local group to be sure.

Much of this software can also be found on electronic bulletin board systems run by local groups. You may be able to get some of the software onto 128 disks by downloading it from such a BBS.

First Osborne Group

The First Osborne Group (FOG) was formed soon after the original Osborne computer became available. Although the computer came with a word processor, spreadsheet and other good programs, the documentation left a lot to be desired.

For those new to computers, user support groups became a way of life. Since FOG was one of the first and most active groups formed, it flourished. (Being in the heart of Silicon Valley and a stone's throw from the Osborne corporate headquarters didn't hurt, either.)

Before long, as users took old programs and converted them to run on the Osborne, a library of public domain software was established. FOG offers this software to its members for a small fee.

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I highly recommend that you consider a FOG membership, which costs $24 per year. Besides gaining access to the FOG library, you get a 64-page monthly newsletter. The *FOGhorn* is one of the best newsletters available for CP/M users. It includes announcements of new products, software reviews by other users and helpful hints galore. While much of the *FOGhorn* deals with the Osborne computers, it is expanding to cover other CP/M systems.

The executive director of FOG, Gale Rhoades, says the group is already gearing up to help C-128 users. "We've already had several calls from new 128 owners. Eventually, we'll probably add a Commodore 128 disk library. Any time a new group of CP/M users comes along, we just naturally want to include them."

As with other computer user groups, FOG members run a system of electronic bulletin boards around the country. Although these boards allow visitors, only FOG members are given access to the download software areas.

Poseidon Electronics

While many of the public domain programs provided by SIG/M and FOG may run with no modification on the 128, there is no guarantee of this, short of trying them out yourself before buying.

Or, you could contact Poseidon Electronics. Their catalog of software states specifically whether the programs run on a 128, 64 with CP/M cartridge, or not at all. In some cases, the user is forewarned that software on a particular disk is experimental and may need modification to run on the 128. But, at least you know what you're getting in advance.

Electronic Bulletin Boards

You can also obtain software by downloading programs from local electronic bulletin boards. To successfully download programs you need a modem, a reasonably clean telephone line, a program that can speak to other computers (usually called a terminal package or modem software) and a disk on which to save the downloaded files.

On some of these BBSs, downloading software is very easy. The main menu provides an option (generally D for download) that will take you to another menu (or series of menus) that lists the software available. You choose the program or file you want to download and, by either typing the name or a menu choice, you tell the computer to send it to you.

Just prior to typing in the instruction to send, you must open the buffer (storage area in your computer's memory), which will hold the program or file. When the computer at the other end starts sending, all the information goes into the buffer. When the other computer indicates it's through, you save the buffered file to disk.

This is a very basic description of what happens with typical systems. You'll need to know what baud rate, word length and parity options the other computer is using. In some cases, the other computer (called a remote terminal in some software documentation) will be using a special file-transfer protocol. If your computer isn't using the same parameters, you won't be able to download.

Remote CP/Ms and XModem

One particularly popular type of bulletin board is the Remote CP/M (RCP/M). It should be of special interest to you, since most such boards contain vast libraries of public domain CP/M programs that you can download and use.

SIG/M Users Group of ACG-NJ
PO Box 97
Iselin, NJ 08830

FOG
PO Box 3474
Daly City, CA 94015-0474
415-755-4140
Programs are available on disk for $4 per disk. The library directory disk is $5.

Poseidon Electronics
Ralph S. Lees, Jr.
103 Waverly Place
New York, NY 10011
212-777-9515
Disks cost $15.25 each. A catalog is available for a SASE with $.44 postage.

Table 1. *Key sources of public domain software.*

Phone Number	Location
415-755-2000	Daly City, CA (voice only)
415-755-2030	FOG Office
604-941-2972	Vancouver, BC
415-992-8542	Daly City, CA
415-591-6259	Belmont, CA
415-424-1482	Palo Alto, CA
415-755-8315	FOG Office (uploading only)
717-657-8699	Harrisburg, PA
415-285-2687	San Francisco, CA
415-851-7732	Woodside, CA
405-848-5317	Oklahoma City, OK
217-344-4032	Urbana, IL
707-557-4403	Vallejo, CA
817-662-2487*	Waco, TX
615-321-0669	Nashville, TN
502-241-4109*	Louisville, KY
319-326-3904	Davenport, IA
313-792-7169	Mt. Clemens, MI
404-354-0662	Athens, GA
617-288-4667*	Boston, MA
714-962-9999	Huntington Beach, CA
415-692-1406	Burlingame, CA
408-287-7108	San Jose, CA

Table 2. *FOG user groups' boards. An asterisk (*) indicates 300 baud only. All other boards are 300 and 1200 baud.*

RCP/Ms generally run a bulletin board system that provides an option to "go to CP/M." But before you can download software, you must usually fulfill an extra requirement. Some BBSs require you to call back again later, pay a small access fee, or be a member of the user group.

RCP/Ms usually use a transfer protocol called XModem, which has become a de facto standard. When you get to CP/M on an RCP/M, the other computer is actually running a program that simulates the CP/M operating system. You'll see the familiar A> prompt on your screen. The commands that you type on your keyboard are interpreted by the other computer as if you were typing on its keyboard. TYPE NEWUSER.TXT, for instance, would cause the contents of the file NEWUSER to be typed out on your monitor.

A DIR command will give you the contents of the A: drive. I recommend opening your buffer and storing the results in a file. Typically, a directory listing of one drive on an RCP/M takes up about 4K on disk.

Each board features a file named DIR.TQT, or something similar, which usually contains the entire directory listing for all drives. The Q in .TQT stands for squeezed. This common naming convention (putting Q as the next to the last letter in a filename) is used to let you know that an unsqueeze program must be used to put the file in a readable format.

This program, usually abbreviated USQ-# (where # is

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Massachusetts

Dave Mitton
NECS New England Computer Society
13 Swan St.
Arlington, MA 02174
617-646-3080
617-646-3610—CBBS

Mark Fishman
51 Grandview Road
Arlington, MA 02174

Doug Fuller
TBBS
Interstate Business Computers
Ludlow, MA 01056
413-589-7490

New Hampshire

Steve Peterfreund
MicroProcessor Associates
Box 7788
Nashua, NH 03060
603-888-9900
603-888-4488—CBBS

Rhode Island

Dean Kelchner
11-B Sandy Point Farm
Portsmouth, RI 02871
401-847-3215

Connecticut

Henry B. Rothberg
Laticrete Intl., Inc.
1 Laticrete Park North
Bethany, CT 06525
203-397-0041
203-393-0010 x202—days

Colin J. Evans
150 Walnut Street
Stratford, CT 06497

Delaware

James A. Dorsman
RD 2, Box 241
Hockessin, DE 19707
302-239-6744

New Jersey

ACG-NJ Amateur Computer Group of NJ
SIG/M—Worldwide Headquarters
PO Box 97
Iselin, NJ 08830
201-272-1874—RBBS
215-398-3937—RBBS

Bruce Blakeslee
SIG/M—Information Secretary
906 Crestwood Road West
Westfield, NJ 07090
201-233-3185

Glenn Dusch
SIG/M—Order Processing
Westfield, NJ 07090
201-233-6292

Gardner Harris
ACG-NJ Morrow MicroDecision Librarian
West Orange, NJ
201-731-6271

Steve Leon
SIG/M—Disk Editor
200 Winston Drive
Cliffside Park, NJ 07010
201-886-1658

Sol Libes
SIG/M—Catalog Editor
PO Box 1192
Mountainside, NJ 07092
201-277-2063

Gilbert Linn
SIG/M—Catalog Distribution
28 Midland Blvd.
Maplewood, NJ 07040
201-763-6974

Kevin O'Connell
RCA—VM Systems
Cherry Hill, NJ 08034
609-461-4351

Dave Raibert
SIG/M—Treasurer
10 Wilsey Square
Ridgewood, NJ 07450
201-444-4600

Ken Tompkins
Stockton Computer Group—Apple Microlab
Stockton State College
Pomona, NJ 08240
609-652-1776 x497

David Wrobel
SIG/M—Chairman
8 Telegraph Hill Road
Holmdel, NJ 07733
201-264-8242

Bill Woythaler
ACG-NJ Northstar Users Group
296 Summit Ave.
Summit, NJ 07901
201-273-3955

Todd Herring
Dept. of Electronic Engineering Technology
Trenton State College
Trenton, NJ 08625
609-771-2487

New York

Henry Kee
SIG/M—Librarian
NYACC-New York Amateur Computer Club
42-24 Colden St.
Flushing, NY 11355
718-539-3202
718-539-3338—BBS

Gerald Harrison
LICA-Long Island Computer Association
36 Irene Lane East
Plainview, NY 11803
516-822-1697
516-561-6590—CBBS
212-448-6576—CBBS

Charlie Strom
CPM-SIG
CompuServe
New York, NY
212-982-2237

Ohio

J.C. Kramer
PO Box 28606
Columbus, OH 43228-0606
614-279-8271

Charles E. Lewis
SIG/M—Ohio Area
Cleveland Digital Group
379 South Hametown Road
Copley, OH 44321
216-666-5982
216-645-0827—RCP/M

Dave Robling
SIG/M—Ohio Area
Dayton Microcomputing Society
2629 Ridge Ave.
Dayton, OH 45431
513-258-2218
513-256-7227—CBPS

Pennsylvania

William Earnest SIG/M—Atlantic Region & Sysop
Lehigh Valley Computer Group
RD#1, Box 830
Orefield, PA 18069
215-398-1634
215-398-3937—CBBS

Robert Todd
SIG/M—Regional Distribution Coordinator
ACG-NJ Vice President
Philadelphia Area Computer Society
1121 Briarwood
Bensalem, PA 19020
215-752-4604

Philadelphia Area Computer Society
LaSalle College
Philadelphia, PA 19141
215-951-1255

Philadelphia Area Computer Society
Apple II SIG/M Library
PO Box 477
Kulpsville, PA 19442

Maryland

James E. Higgins
Epson UG of South Maryland
SRB 222
Piney Point, MD 20674

North Carolina

John A. Kieffer
East Carolina CP/M Users Group
104 Hawthorne Court
Havelock, NC 28532
919-447-3108

John Johnson
East Carolina CP/M Users Group
707 Edge Hill Road
New Bern, NC 28560
919-628-6976

South Carolina

James Colligan
157 MacGregor Drive
Summerville, SC 29483
803-871-3404

Tennessee

Joel L. Saber
Rt. 1
Allons, TN 38541
615-528-5039—CBBS

Virginia

Stan Levine
SIG/M Mid-Atlantic Regional Coordinator
CP/M Users of Washington, DC
2053 N. Abingdon St.
Arlington, VA 22207
703-522-1192

Sam Hunt
Metro Washington CPMUG
4711 Olley Lane
Fairfax, VA 22032
703-323-7627

Jack Williams
Microcomputer Investors Association
902 Anderson Drive
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Digital Interest Group In Tidewater
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804-898-7493—RBBS

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703-384-6871

Christopher Leithiser
Washington Apple Pi
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Springfield, VA 22152
703-569-8037

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205-277-5591

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Mike Niswonger
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Altemonte Springs, FL 32701
305-830-7319
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Doug Elkins
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Table 3. *Regional distributors of SIG/M software. Phone numbers* without *initials beside them are voice only.*

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404-636-6130 212a—CBBS
404-394-4220 212a—CBBS

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Jim Mills
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CACHE/CPMUG
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Chicago, IL 50606-7092
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312-469-2597—RCPM
312-545-8086—RCPM

Stanley Hanson
Northrop Microcomputer Users Group
182 East Road
Glen Ellyn, IL 60137
312-469-3246

Indiana

Stephen L. Browning
Indianapolis Small Systems Group (ISSG)
PO Box 40733
Indianapolis, IN 46240

Michigan

Dave Hardy
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313-846-8000
313-846-6127—CBBS
313-846-1055

Kenneth Jackson
c/o CyberSource
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Southfield, MI 48034
313-353-8660
313-422-8585

Dale Ellard
8335 Douglas Road
Lambertville, MI 48149

Wisconsin

Dr. Charles J. Wunder
Milwaukee Heath Users Group
Computer Users Federation
30531 Grand Ave.
PO Box 20
Waterford, WI 53185

Kansas

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Kansas City Metro Users Group
7010 Caenen Ave.
Shawnee Mission, KS 66216
913-268-4329

Louisiana

Homer Branch
Heath UG of New Orleans
703 Valence
New Orleans, LA 70115
504-891-4951

Oklahoma

Si Hawk
Tulsa Computer Society
PO Box 1133
Tulsa, OK 74101
918-241-4571
918-446-5219—CBBS

Texas

Frank Wancho
SIG/M Liaison—ARPA-NET
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El Paso, TX 79925
915-591-7266

Roger Schermerhorn
3103 Sleepyhollow
Sugarland, TX 77478
713-980-3128

Al Whitney
1203 Austin Colony
Sugarland, TX 77469
713-342-5139
713-469-8893—CBBS

Fred Pfafman
SIG/M—South Central Region
Texans Computer Club
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Plano, TX 75075
214-596-5034

Charles Sandborne
Houston Area RBBS
SATSUMA
Houston, TX
713-469-8893—CBBS

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602-997-1332

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San Diego Computer Society
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INSUA—Int'l Northstar Users Assn.
PO Box 2789
Fairfield, CA 94533
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Sam Lay
SIG/M—Co-regional Southwest Region
South Orange County Computer Club
6771 Bonnie Drive
Huntington Beach, CA 92647
714-842-6588

Jim Ayers
Apple CPMUG of Small Computer Users of Marin
301 Poplar St.
Mill Valley, CA 94941
415-383-0473—CBBS

Charlie Foster
JRT Pascal & Z Users Group
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John Moorhead
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Simi Valley, CA 93065
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1798 Celeste
Clovis, CA 93612
209-297-8591

Trevor Marshall
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Northwest Computer Society
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Seattle, WA 98188
206-244-8558

Tim Linehan
SIG/M Co-regional Sysop
Olympia RCPM
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Olympia, WA 98502
206-357-7400
206-357-6300
206-352-7530—CBBS

Hawaii

James Yuen
SIG/M—Co-regional Far East Region
Aloha Computer Club
919 Luna Helu St.
Kailua, HI 96734
808-262-2845

Canada

British Columbia

Dave Bowerman
SIG/M—Canada Northwest Region
West Coast Computer Society
PO Box 4031
Vancouver, BC V6B 3Z4
or
2058 Highview Place
Port Moody, BC V3H 1N5
604-937-3148
604-937-0906—CBBS

Ontario

Judson Newell
SIG/M—Canada Northeast Region
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Islington, Ontario M9A 1A7
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416-231-1262

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R.O.M.S.
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the latest version number, currently 20), is found on most RCP/Ms and in most public domain libraries. Its companion program, SQUEEZE (SQ-#, currently 17), is as widely distributed. Sometimes the two can be found in an .LBR file called SQ-USQ.LBR. They will be two of the first programs you'll want to get.

To accomplish the file transfer, you'll need to understand the commands. Check your documentation! If you are actually using XModem, the command to type is "XMODEM R filename," where filename is how you want the file to be saved on disk.

Once you understand how to start receiving a program at your end, you need to know how to get the RCP/M to start sending. Pick the file you want to download and note its name. Type "XMODEM S filename." You must type the filename exactly as it appears in the directory listing. The remote terminal will respond with "Awaiting NAK."

In a second or two you should see the message, "Transmitting sector #." The number will start at one and increment as each piece of the file is successfully transmitted. You may see a message indicating that a sector is being retransmitted because an error was detected. Don't worry about it.

XModem will make ten attempts to transmit an erroneous block. If it doesn't accomplish a successful transfer by then, it halts the transmission and reports the problem. When it gets through sending all the parts, it will give a message indicating the transfer is complete and indicate how many times sectors had to be resent.

That's all there is to it. Your terminal program should have written the file to disk for you under the filename you specified.

Where the BBSs Are

This article includes three lists of electronic BBSs. The first (Table 1) lists three key sources of public domain software. The second (Table 2) consists of the telephone numbers of FOG user groups' boards. The third (Table 3) is a list of regional distributors of SIG/M.

Please be aware that not all of these systems are free. Some require a registration fee or yearly membership fee. Please make note of the times listed for each system. These hours are in local time, so please plan your calls accordingly.

Also, courteous telecommunicators will leave a thank-you message or some acknowledgement for the system operator, if there is a message base available. Leave your name and where you are calling from if the board doesn't ask for it when you first sign on.

CompuServe's CP/M SIG also has a large library available, and, as mentioned earlier, it supports XModem transfers. Type GO CPMSIG or GO PCS-47. Once in the SIG, you'll need to go to the DLs (data libraries) to find the programs you want.

You can use a BRO (browse) command to search through the files one by one; or type INDEX to see a listing of the programs in each library. There are ten DLs available.

As you can see, there is plenty of public domain software. And finding it is half the fun. Good luck in your hunt. R

Cheryl Peterson (750 85th St. #3, Miami Beach, FL 33141) is the SYSOP of the Beginner's SIG on Viewtron. Her user number is 266399CCP.

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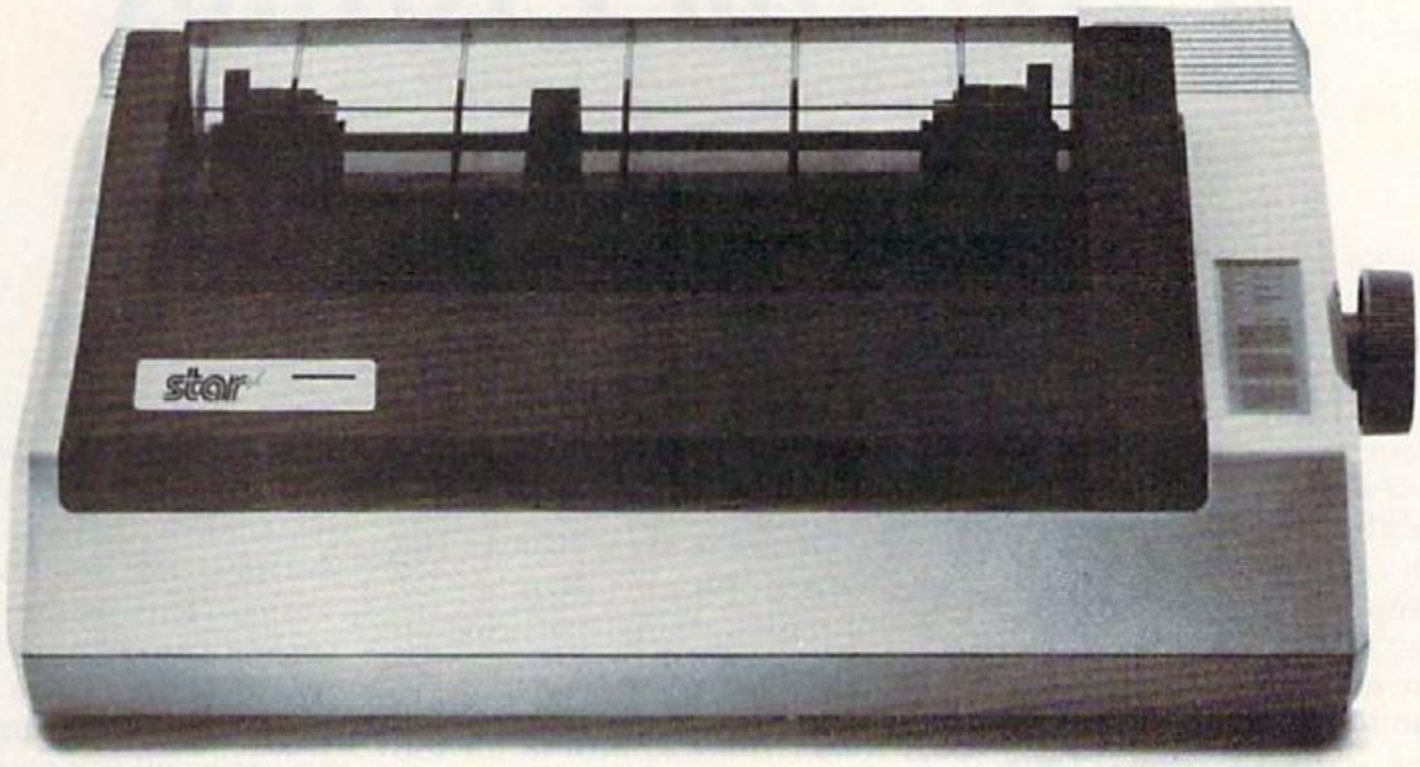

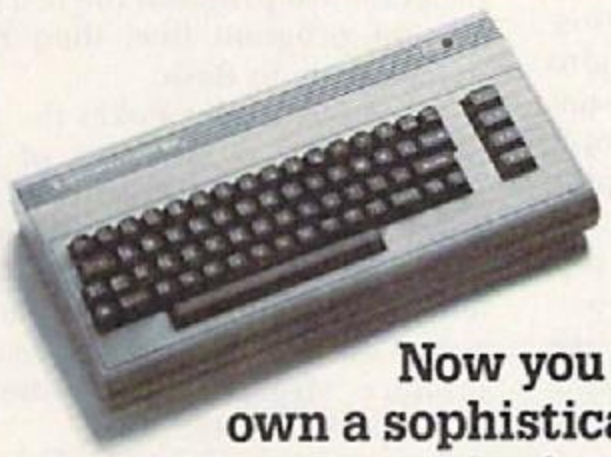

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Add Elegance to Your Program Listings

Here's a utility that organizes and clarifies your program listings by providing uniform spacing between words, numbers and symbols.

By MICHAEL BROUSSARD

When you're trying to debug or modify a Basic program, which occurs first—eyestrain or madness?

In Basic, difficult-to-read program listings often result when you crowd statements into program lines to conserve memory and increase execution speed. Under such circumstances, it's not much fun trying to decipher, say, where a loop starts and stops. The accompanying utility, Lister, puts uniform spaces between words, numbers and symbols in your program listings.

Lister is a machine language program that resides in upper RAM. When you run it, it produces a formatted listing of the Basic program currently in memory, making it much more readable.

To use Lister, you must first load it into RAM using the Basic loader (Listing 1), which I'll describe a little later in the article. To run it, you type:

```
SYS 49152
```

Lister first clears the screen, then asks:

```
OUTPUT TO SCREEN OR PRINTER (S/P)?
```

at which time you type either S or P. If you choose the printer, the program automatically uses device number 4. If you are using a different device number, you can customize Lister by changing the value in line 100 of the Basic loader program. If you choose the printer as the output device, Lister next prompts:

```
TYPE IN A HEADING TO APPEAR AT THE
TOP OF EACH PAGE:
```

At this point, you type a string up to 60 characters long and press the return key. This string, along with a page number, will appear at the top of each page of the output listing. Lister automatically leaves margins at the top and bottom of each page. If you don't want a heading, simply press the return key without typing in a string. The page numbers and margins will still be printed. To suppress the page numbers and the spacing between pages, simply type the @ character in response to the heading prompt.

At this point, Lister works its magic and produces a neatly formatted listing on either the printer or the screen. Spaces are placed before and after Basic keywords and arithmetic operators. Only one Basic statement is printed per line, making each statement easy to read and allowing room in the right margin for notes or corrections on hard-copy listings.

When a For statement is encountered, all the following statements up to the corresponding Next statement are indented two extra spaces. This lets you see at a glance which statements are part of which loops and how the loops are nested.

During the listing display, you can pause the output by pressing any key. Pressing any other key restarts the listing. (This feature is particularly convenient when you're listing to the screen.) If you press the Q key (for quit) while the listing is paused, the program will print out the rest of the current program line, then return immediately to Basic.

The Basic loader Pokes the Lister program into a safe part of RAM, where it won't be disturbed by Basic. You can then load in the Basic program on which you're working. As long as you don't turn off the computer, Lister will be there, ready to produce elegant output whenever you type SYS 49152.

Since the loader is mostly composed of Data statements that must be typed in exactly, each line of data has a built-in checksum. The loader checks each line of data as it is read; if an error is detected, the program notifies you which Data statement to check and then ends.

I hope you find Lister as useful as I do. R

Address all author correspondence to Michael Broussard, 15279 Forest Grove Drive, Woodbridge, VA 22191.

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Listing 1. *Lister Basic loader program.*

```
100 DEV=4 : REM PRINTER DEVICE NUMBER
                                        :REM*60
110 LOC=49152:LINE=1000                  :REM*2
120 PRINT"POKING DATA FROM LINE"LINE:K=0:CH
    ECK=0                               :REM*248
130 IF LOC>50148 THEN170                 :REM*30
140 READN:POKELOC,N:LOC=LOC+1:CHECK=CHECK+N
    :K=K+1:IFK<16THEN130                :REM*120
150 READ N:IFN=CHECKTHENLINE=LINE+10:GOTO12
    0                                   :REM*196
160 PRINT"DATA STATEMENT ERROR ON LINE"LINE
    :END                                :REM*122
170 READ N:IFN<>CHECKTHEN160             :REM*248
180 POKE 49250,DEV                      :REM*112
190 PRINT"{CRSR DN}LISTER LOAD SUCCESSFUL."
    :PRINT"SYS 49152 TO START":END :REM*130
1000 DATA 162,0,189,140,195,240,6,32,210,25
     5,232,208,245,32,228,255,2629 :REM*163
1010 DATA 240,251,201,83,208,11,141,232,195
     ,169,147,32,201,194,76,120,2501
                                        :REM*123
1020 DATA 192,201,80,208,232,141,232,195,32
     ,210,255,32,199,194,162,0,2565:REM*219
1030 DATA 189,177,195,240,6,32,210,255,232,
     208,245,162,61,169,0,157,2538 :REM*248
1040 DATA 254,195,202,169,32,157,254,195,20
     2,208,250,32,207,255,201,13,2826
                                        :REM*142
1050 DATA 240,8,157,254,195,232,224,60,208,
     241,169,1,141,244,195,169,2738:REM*190
1060 DATA 3,162,4,160,255,32,186,255,169,0,
     32,189,255,32,192,255,2181     :REM*204
1070 DATA 162,3,32,201,255,32,91,194,165,43
     ,133,251,165,44,133,252,2156  :REM*128
1080 DATA 198,251,169,0,141,233,195,169,6,1
     41,236,195,173,233,195,208,2743:REM*88
1090 DATA 39,160,0,169,0,141,230,195,141,24
     5,195,141,234,195,141,246,2472 :REM*64
1100 DATA 195,141,229,195,162,3,177,251,208
     ,3,238,230,195,200,202,208,2837
                                        :REM*138
1110 DATA 245,173,230,195,201,3,208,7,32,19
     9,194,32,231,255,96,177,2478  :REM*218
1120 DATA 251,141,242,195,200,177,251,140,2
     53,195,141,243,195,162,0,32,2818
                                        :REM*212
1130 DATA 67,194,32,195,194,169,2,141,246,1
     95,172,253,195,200,177,251,2683
                                        :REM*204
1140 DATA 208,23,140,253,195,32,74,195,173,
     253,195,24,101,251,133,251,2501
                                        :REM*156
1150 DATA 169,0,101,252,133,252,76,140,192,
     170,173,245,195,208,43,138,2487
                                        :REM*170
1160 DATA 201,177,144,25,201,180,176,21,41,
     127,141,251,195,173,239,195,2487:REM*4
1170 DATA 208,3,32,195,194,169,1,141,239,19
     5,76,139,193,173,239,195,2392  :REM*18
1180 DATA 240,3,32,195,194,169,0,141,239,19
     5,138,201,58,208,23,173,2209  :REM*232
1190 DATA 245,195,240,4,169,58,208,43,32,19
     5,194,169,58,32,201,194,2237   :REM*94
1200 DATA 32,74,195,76,221,192,138,201,34,2
     08,13,173,245,195,73,255,2325 :REM*222
1210 DATA 141,245,195,169,34,76,232,193,201
     ,32,208,13,173,245,195,240,2592
                                        :REM*202
1220 DATA 0,169,32,32,201,194,76,221,192,20
     1,128,176,3,76,232,193,2126    :REM*58
1230 DATA 173,245,195,208,115,138,41,127,14
     1,251,195,201,2,208,9,173,2422 :REM*36
1240 DATA 236,195,56,233,2,141,236,195,32,1
     95,194,162,0,140,253,195,2465 :REM*250
1250 DATA 160,0,236,251,195,240,14,185,158,
     160,201,129,144,4,232,200,2509:REM*196
1260 DATA 208,240,200,208,242,185,158,160,2
     01,129,144,54,41,127,32,201,2530
                                        :REM*208
1270 DATA 194,173,239,195,208,22,173,251,19
     5,201,35,240,15,201,38,240,2620
                                        :REM*244
1280 DATA 11,201,52,144,4,201,75,144,3,32,1
     95,194,173,251,195,201,2076    :REM*45
1290 DATA 1,208,9,173,236,195,24,105,2,141,
     236,195,172,253,195,76,2221   :REM*161
1300 DATA 221,192,32,201,194,200,208,189,32
     ,201,194,76,221,192,169,48,2570
                                        :REM*247
1310 DATA 141,231,195,173,242,195,56,237,24
     0,195,141,242,195,173,243,195,3094
                                        :REM*29
1320 DATA 237,241,195,141,243,195,144,5,238
     ,231,195,208,230,24,173,240,2940
                                        :REM*159
1330 DATA 195,109,242,195,141,242,195,173,2
     41,195,109,243,195,141,243,195,3054
                                        :REM*121
1340 DATA 173,231,195,201,48,208,9,173,234,
     195,208,7,169,32,208,6,2297      :REM*1
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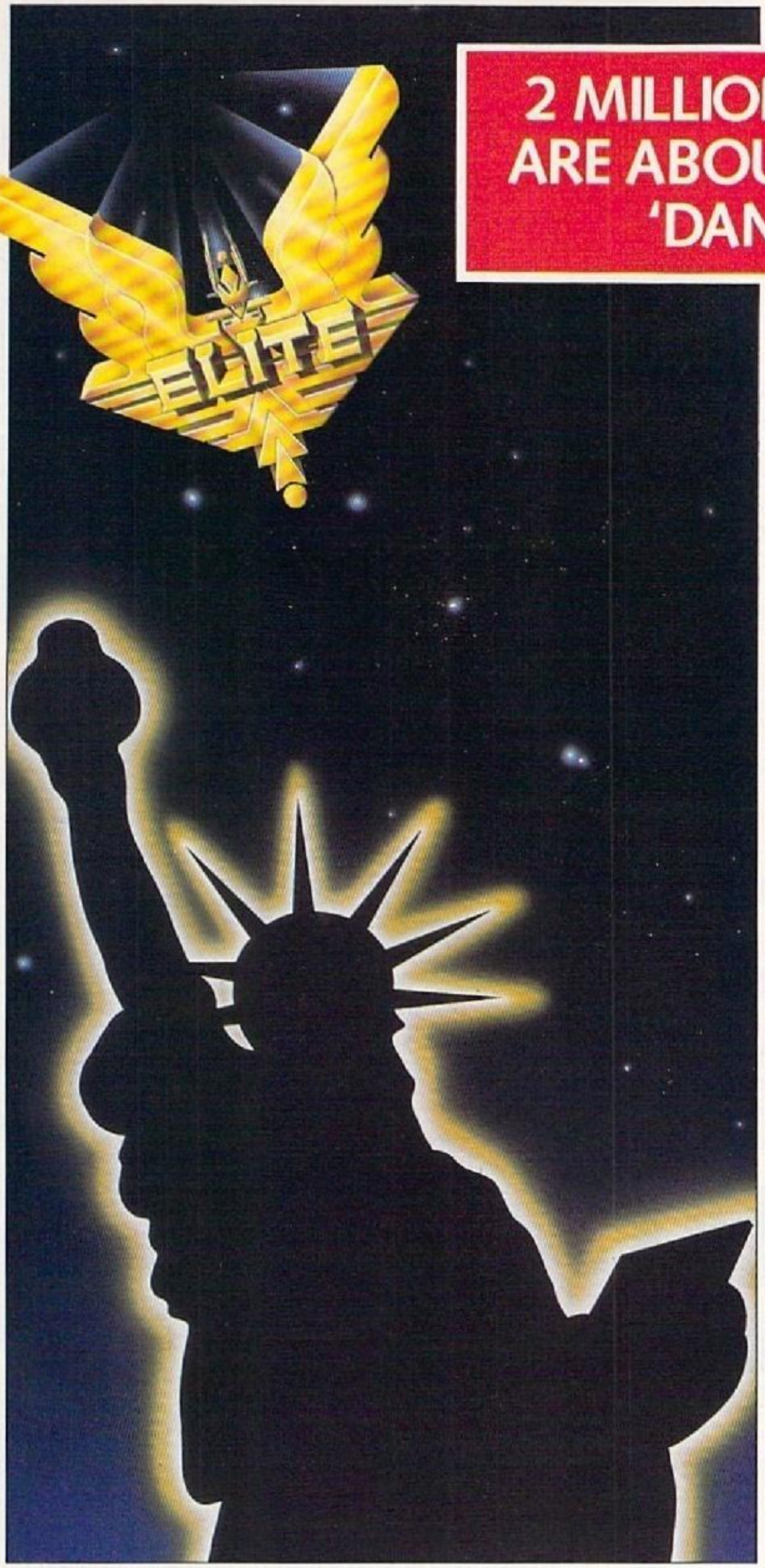

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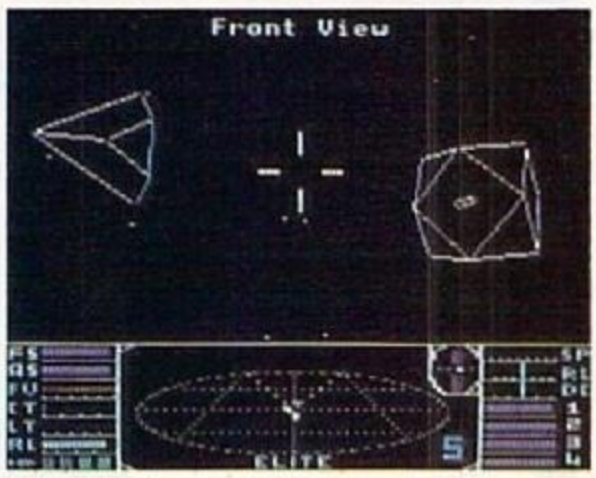

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Listing 1 continued.

```
135Ø DATA 141,234,195,173,231,195,32,2Ø1,19
     4,169,Ø,141,237,195,174,252,2764:REM*9
136Ø DATA 195,232,232,189,217,195,2Ø1,42,2Ø
     8,1,96,142,252,195,141,24Ø,2778:REM*85
137Ø DATA 195,232,189,217,195,141,241,195,7
     6,238,193,173,254,195,2Ø1,64,2999
                                    :REM*19
138Ø DATA 24Ø,96,32,199,194,162,Ø,189,133,1
     95,24Ø,6,32,21Ø,255,232,2415  :REM*157
139Ø DATA 2Ø8,245,162,Ø,189,254,195,24Ø,6,3
     2,21Ø,255,232,2Ø8,245,162,2843:REM*251
14ØØ DATA Ø,189,211,195,24Ø,6,32,21Ø,255,23
     2,2Ø8,245,169,Ø,174,244,261Ø   :REM*79
141Ø DATA 195,14Ø,253,195,32,2Ø5,189,172,25
     3,195,32,199,194,162,Ø,189,26Ø5
                                    :REM*133
142Ø DATA 133,195,24Ø,6,32,21Ø,255,232,2Ø8,
     245,162,67,169,45,32,21Ø,2441 :REM*111
143Ø DATA 255,2Ø2,2Ø8,248,32,199,194,32,199
     ,194,169,5,141,238,195,238,2749
                                    :REM*255
144Ø DATA 244,195,96,169,32,2Ø8,2,169,13,14
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145Ø DATA 235,195,2Ø1,32,2Ø8,17,2Ø5,237,195
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                                    :REM*2Ø9
146Ø DATA 24Ø,6Ø,173,246,195,2Ø8,55,173,246
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                                    :REM*199
147Ø DATA 2,24Ø,4,138,76,251,194,138,56,233
     ,6,141,23Ø,195,141,229,2274   :REM*1Ø3
148Ø DATA 195,24Ø,12,169,32,32,21Ø,255,2Ø6,
     23Ø,195,2Ø8,246,169,Ø,141,254Ø :REM*55
149Ø DATA 246,195,173,235,195,141,237,195,3
     2,21Ø,255,238,229,195,32,228,3Ø36
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15ØØ DATA 255,2Ø8,2,24Ø,3Ø,169,128,141,249,
     195,141,25Ø,195,2Ø6,249,195,2853
                                    :REM*219
151Ø DATA 2Ø8,251,2Ø6,25Ø,195,2Ø8,246,32,22
     8,255,24Ø,251,2Ø1,81,2Ø8,3,3Ø63:REM*97
152Ø DATA 141,233,195,172,247,195,174,248,1
     95,96,32,199,194,173,232,195,2921
                                    :REM*51
153Ø DATA 2Ø1,8Ø,2Ø8,43,173,229,195,2Ø1,8Ø,
     144,8,238,238,195,169,Ø,24Ø2  :REM*243
154Ø DATA 141,229,195,238,238,195,173,238,1
     95,2Ø1,62,144,18,173,254,195,2889
                                    :REM*84
155Ø DATA 2Ø1,64,24Ø,11,162,5,32,199,194,2Ø
     2,2Ø8,25Ø,32,91,194,169,2254  :REM*25Ø
156Ø DATA 1,141,246,195,96,32,32,32,32,32,3
     2,Ø,147,73,85,84,1266         :REM*24Ø
157Ø DATA 8Ø,85,84,32,84,79,32,8Ø,82,73,78,
     84,69,82,32,79,1135           :REM*58
158Ø DATA 82,32,83,67,82,69,69,78,32,4Ø,8Ø,
     47,83,41,63,32,98Ø            :REM*164
159Ø DATA Ø,84,89,8Ø,69,32,73,78,32,65,32,7
     2,69,65,68,73,981             :REM*16Ø
16ØØ DATA 78,71,32,7Ø,79,82,32,69,65,67,72,
     32,8Ø,65,71,69,1Ø34           :REM*12
161Ø DATA 58,13,Ø,8Ø,65,71,69,32,Ø,16,39,23
     2,3,1ØØ,Ø,1Ø,788              :REM*36
162Ø DATA Ø,1,Ø,42,42,85           :REM*156
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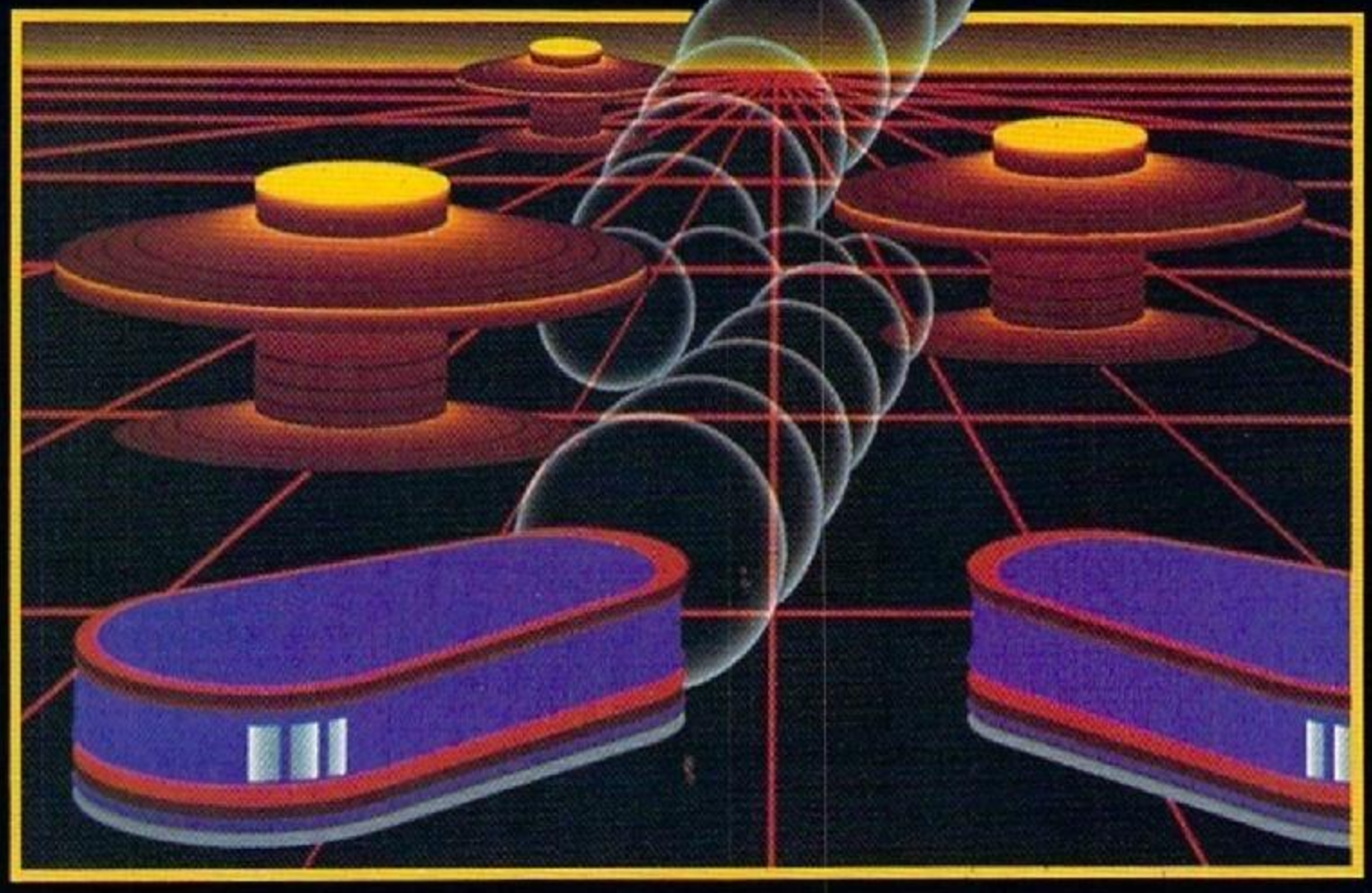

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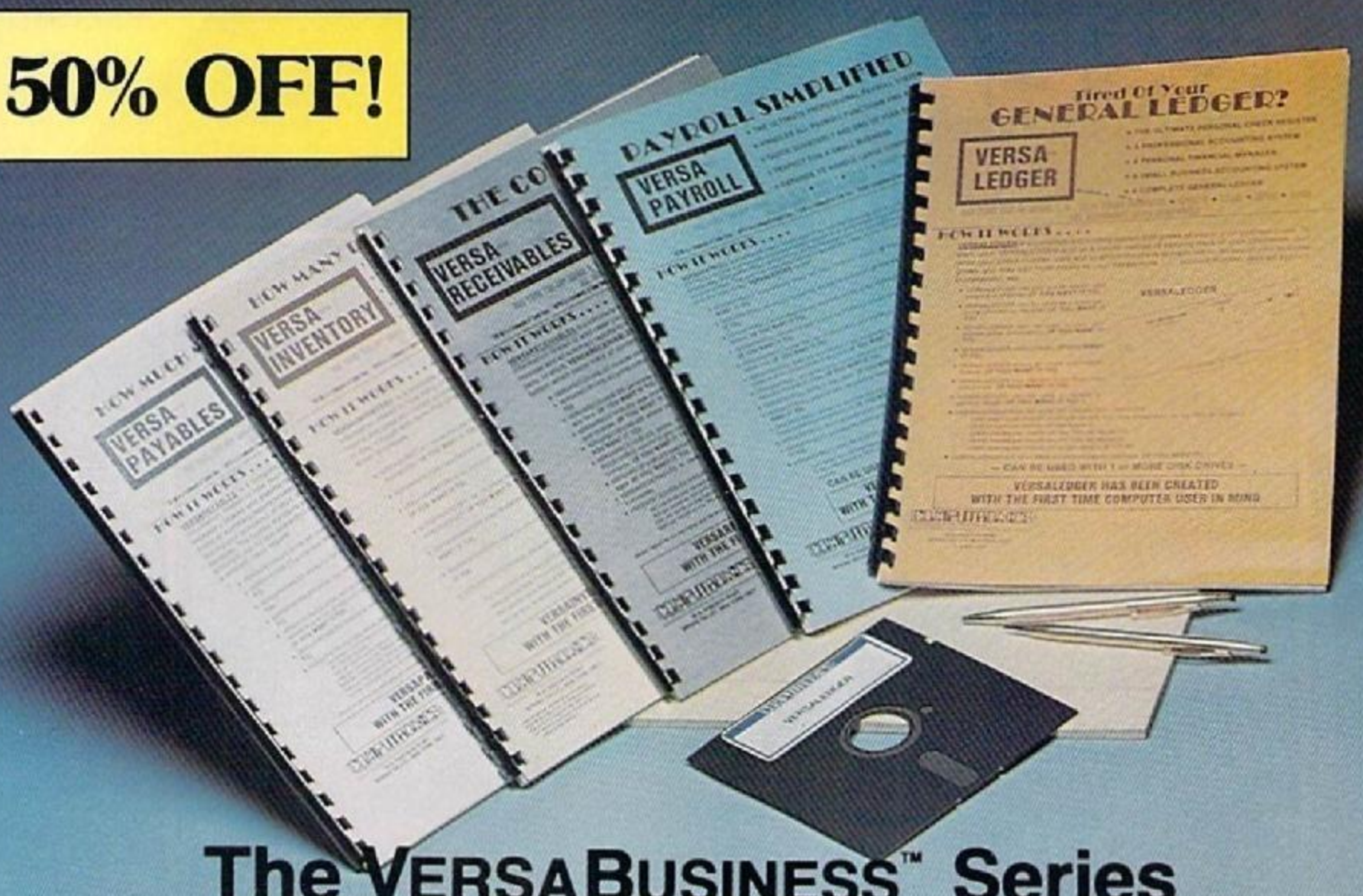

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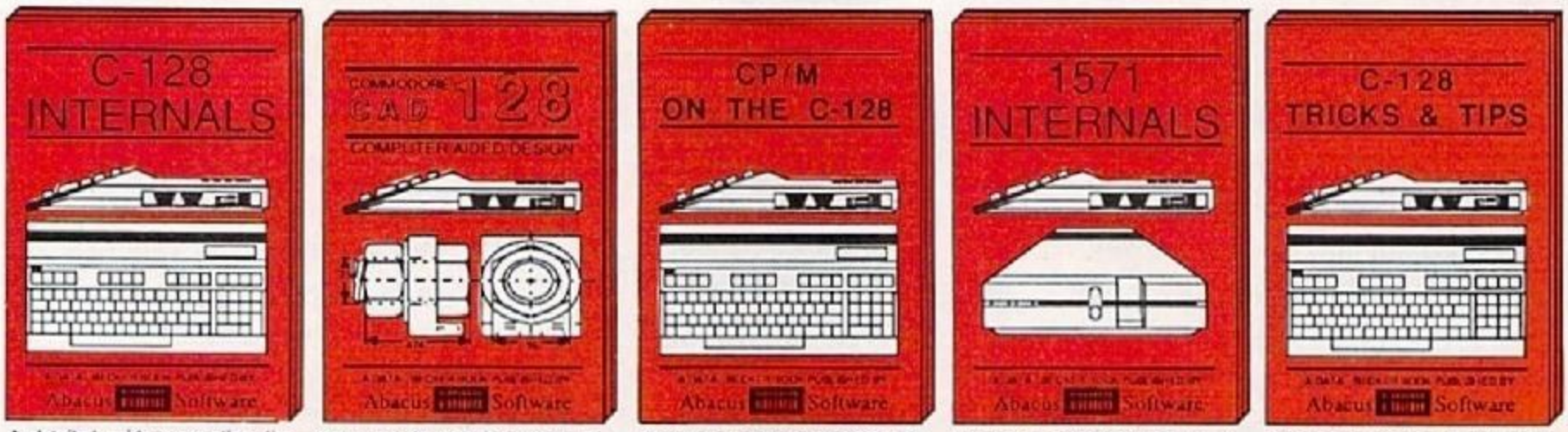

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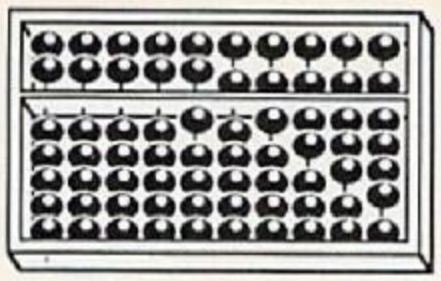

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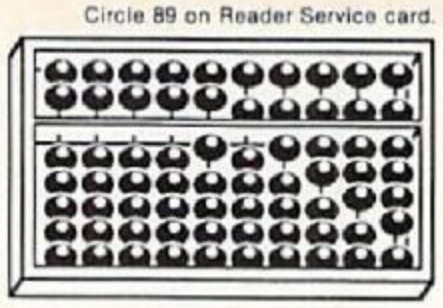

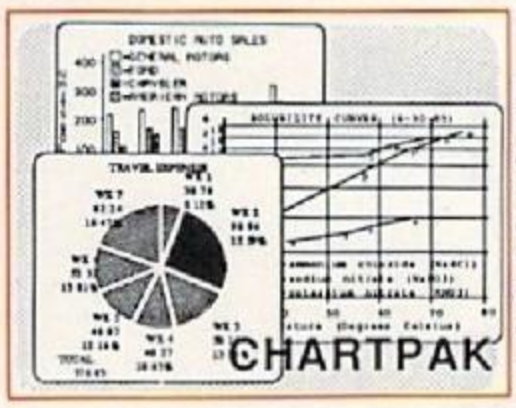

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RUN's Great Communicator—

Runterm Plus

By ROBERT SIMS

This article, which features Runterm Plus, Part 2, concludes the documentation for Runterm Plus.

Part 2 is a continuation of the code you entered last month. If you remember, in last month's article you were advised to set aside the disk containing Part 1. You then modified Part 1 so it would load normally. Do not use the modified file, Runterm Plus.1, when you type in the code for Part 2. Use the original code, Runterm Plus.

To resume typing in the code, load and run ML Perfect Typist (see p. 50 in the December '85 issue).

Select option 2 from the opening menu and insert the disk containing the unmodified code for Part 1. When prompted for the filename, enter Runterm Plus. When prompted for the starting line number, enter the first four digits from the accompanying listing (Listing 1). Next, type in the lines according to the ML Perfect Typist instructions.

After you've finished entering the code and have saved it to disk as Runterm Plus, clear your computer with SYS64738. Enter

```
LOAD"RUNTERM PLUS",8,1
```

and enter the following Pokes in Immediate mode:

For those of you who have been anxiously awaiting the conclusion of Runterm Plus, here's your reward . . . a complete, professional-quality terminal program that lets you communicate with all on-line services, use XModem file transfers, play interactive modem games, transfer hi-res graphics screens, and more.

```
POKE 2049,11
POKE 2050,8
POKE 2051,10
POKE 2052,0
POKE 2053,158
POKE 2054,50
POKE 2055,53
POKE 2056,57
POKE 2057,52
POKE 2058,0
POKE 2059,0
POKE 2060,0
POKE 9808,1
```

Now insert another disk into your drive and enter

```
SAVE"RUNTERM PLUS",8
```

The first 12 Pokes are the same ones entered when Part 1 was modified to insert the Basic line

```
10 SYS2594
```

This allows you to load, save and back up Runterm Plus as you would a Basic program. (If you ordered a disk copy from me instead of typing in the program, this series of Pokes is already in the program.)

The thirteenth Poke sets a flag that activates the routines in Part 2 of the code. (You must enter this Poke whether you typed in the program or ordered the disk copy.)

Your copy of Runterm Plus is now complete and ready to use.

The Opening Menu

Part 1 was set up to be used as a CBM ASCII terminal program operating in half duplex. Now you can configure Runterm Plus to fit almost any telecommunications format. When you load and run Runterm Plus, you will see an opening screen that gives you six options. You may set the program to call a specific national service, such as CompuServe, Delphi or The Source. If you

RUN It Right

C-64; C-128 (in C-64 mode); disk drive

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are calling a BBS, you may choose between standard ASCII or Commodore ASCII. A custom terminal setting is also provided.

Runterm Plus will set up your computer and modem to communicate with the specific service you have selected; you don't have to worry about stop bits, word length or other technical aspects of telecommunications. When using Runterm Plus, be sure to set your modem to the Originate mode. If you have a modem with a data/telephone (voice) switch, first make the call, listen for the carrier signal, then move the switch to data.

The selection of any option, except #6, will cause the screen to clear, signifying that Runterm Plus is ready.

If you choose option 6, you'll be asked to specify the parity, word length, stop bits, duplex and ASCII settings and the deletion character. Once you set these parameters, the screen will clear and you'll be ready to go on-line.

In Part 1, I discussed how to use the capture buffer to upload and download data. Now we'll look at the other two options Runterm Plus gives you for error-free file transfers.

XModem Transfers

To transfer a file directly to or from your disk, use the Logo-X command. The sequence for an XModem transfer is as follows.

You select download or upload from the other computer's menus. The other computer will prompt you when it's ready. You then press Logo-X, select X for XModem and type U or D.

If you select U for upload, Runterm Plus will ask you to supply the name of the existing file to be uploaded. You will be told when the transfer is completed, and keyboard control will resume.

If you select D for download, you will be asked for the filename and file type. (You must not use an existing filename.) The program then creates the new file on the disk. The downloading process then becomes automatic. You need only wait until the program notifies you that the transfer is complete.

If noise on the phone line or some other problem causes the transmission to become garbled, then the garbled portion will be retransmitted to you. If Runterm Plus and the other computer are unable to complete the transfer, Runterm Plus will abort the transfer and return keyboard control to your computer.

A note about CompuServe: Using the XModem feature of Runterm Plus, you can download all files in CompuServe's Commodore Information Network. The special handshakes that are required to download programs with the extension .IMG are handled automatically by Runterm Plus.

High-Resolution Graphics Screens

Runterm Plus can transfer and display high-resolution graphics screens. To view the screen while you're downloading it, it must be in what is commonly called Doodle format. That is, the file must be constructed so that the high-resolution color area is placed first in the file, followed by a bit-mapped screen.

Although the file will transfer without problems, this hi-res feature will not give you a true copy of a multicolored high-resolution screen, which is longer and in a different format than the regular bit-mapped two-color screen.

There are two ways to use this feature. You can either send a hi-res screen or receive one. Keep in mind, however, that your buffer contents will be overwritten during this process. Before viewing a screen, save your buffer contents to disk or print them out before viewing a screen. If your local bulletin board uses Bozart protocols, you will be able to do graphics downloads from the board, too. Check with your SYSOP.

When Runterm Plus is booted, the hi-res feature is turned off. To activate this feature and view a hi-res screen while downloading, use the Logo-A command before you begin the downloading process. You can toggle on and off the Hi-Res Graphics mode by typing Logo-A.

To transfer a hi-res screen, first type Logo-A, as previously discussed, then, when the other computer is ready, select Logo-X to begin the transfer. Select Bozart protocol and then D for download, and the rest is automatic.

The special Bozart graphics protocol is similar to XModem, but faster, more accurate and more automatic. The protocol switches your computer to Hi-Res mode and back to regular screen mode. Also, it includes a handshaking feature, which checks to make sure that the incoming file will fit on your disk. (If the file won't fit, Runterm Plus will abort the file transfer and return to Terminal mode.)

In viewing hi-res files, you may experience a few seconds' delay while the two programs make the initial connection before transferring the file. During this delay, you'll be looking at the bit map of whatever was in the capture buffer. As the transfer progresses, you will see the background color change; then, while the file is being stored to disk, the bit-map screen will appear.

When the transfer is complete, Runterm Plus will pause for three seconds, to allow you to view the hi-res screen, then the screen will clear and you'll be back in Terminal mode.

Keep in mind that the Bozart protocol can only be used to swap files with another terminal program that uses Bozart protocol. Just as you can't speak English and expect to be understood by someone who speaks, say, only French, you can't expect two different transfer protocols to communicate.

Bozart protocol can be used to get an error-free transfer of *any* file, not just graphics files. (The only difference is that you don't use Logo-A to view the non-graphics screen; you go directly to Logo-X for the transfer.)

Although the speed of transfer depends on the file being exchanged and, especially, on the number of repeated characters in the file, as a general rule you can expect to transfer a file 20 percent faster using the Bozart graphics protocols instead of XModem. For example, a typical 9000-byte graphics screen that takes about ten minutes to transfer with XModem will transfer in about seven minutes with Bozart protocol. Faster speeds are not possible, due to the constraints of the 300 bits-per-second speed of the modem.

An interesting side effect of this hi-res capability is that you can get a bit-mapped representation of any non-graphics file being transferred. Use Logo-A before the transfer, just as you would if the file were a graphics screen.

As the file is transferred, you'll see a kind of abstract design being built on your screen. Only actual hi-res screens will show you an organized picture. However, the abstract designs generated by a non-graphics file are more interesting to watch than the constant waiting/transferring messages that normally accompany a file transfer.

Changing Terminal Settings

There are times when you'll want to change your terminal settings

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without restarting the program. To redefine your delete key, use Logo-K. The standard delete character is an ASCII 127. However, some services require you to use a backspace (ASCII 8), and you may need to revert to the Commodore delete character, ASCII 20.

Depending on which service you select from the opening menu, Runterm Plus sets the delete character. For CompuServe and for linkups using Commodore ASCII, the setting is the regular ASCII 20; for Delphi and The Source, the setting is ASCII 127 (true delete).

To reset any or all of your terminal parameters, use Logo-T. This command will review each setting and prompt you to reset it.

Modem Games

The Logo-G command allows you to load and run a special game program while on-line. This feature lets two people with copies of Runterm Plus play a game over their modems during a regular telecommunications session, without breaking the connection or switching programs.

To use this feature, both parties must have a game written specifically for Runterm Plus. Ordinary games will not work, because they load into the same locations in memory where Runterm Plus code resides.

Runterm Plus is designed to accommodate games that use the normal screen and keyboard cursor controls, as well as games that use multiple high-resolution screens and very fast action. If high-resolution graphics are not used in a game, Runterm Plus will accommodate a game program up to 30K in length. With hi-res screens, Runterm Plus will accept a game program of up to 20K, while leaving some memory still available.

RUN will be publishing a game that you can play using Runterm Plus. In the meantime, if you are interested in writing your own modem games, write to me, and I'll tell you how to obtain instructions, programmers' guides and assembly language modules to help you make use of all the gaming features of Runterm Plus.

Other Modems

With a few Pokes, you can use Mitey Mo, HESmodem II or other compatible modems with Runterm Plus. You should make these Pokes, then save the program to disk before running it.

The Pokes for Mitey Mo and HES II are:

```
POKE 9812,38
POKE 9813,32
POKE 9814,38
```

Mitey Mo to call a friend, one of you will have to be in Originate mode, and the other in Answer mode. Runterm Plus will ask you to choose either Answer or Originate when you run the program.

The 1520 Printer/Plotter

If you have a 1520 Printer/Plotter, two Pokes will allow you to use it with Runterm Plus. The first—POKE 9810, 6—changes the device number to 6. The second—POKE 9811,n—changes the secondary address at location 9811, where n is the number for the secondary address that puts the plotter in the mode you want. R

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Listing 1. *Runterm Plus, Part 2.*

```
0701 18 AD AF 41 8D DA 41 C9 18 D0 01 CC 07
0702 60 20 87 1C AE 4E 41 E0 01 F0 D8 C7 07
0703 AD DA 41 C9 31 D0 0D A2 01 8E 3C CB 07
0704 41 A2 02 8E 3B 41 4C 75 28 C9 32 93 06
0705 D0 0D A2 00 8E 3C 41 A2 03 8E 3B B9 06
0706 41 4C 75 28 20 22 18 4C 22 28 A9 85 05
0707 F6 8D 19 1C A9 3D 8D 1A 1C 20 0A 4E 06
0708 1C 20 4A 1C 20 30 18 AD AF 41 8D F8 05
0709 DA 41 C9 18 D0 01 60 20 87 1C AE 63 07
0710 4E 41 E0 01 F0 D8 AD DA 41 C9 31 C0 08
0711 D0 06 A9 14 8D 3A 41 60 C9 32 D0 8D 07
0712 06 A9 08 8D 3A 41 60 C9 33 D0 06 B9 06
0713 A9 7F 8D 3A 41 60 20 22 18 4C 75 74 06
0714 28 A2 00 8E 15 42 8E 16 42 AE 14 21 06
0715 42 E0 01 F0 20 AE AF 41 8E 14 42 80 07
0716 20 13 29 AE 16 42 18 6A 90 48 AD 35 06
0717 AF 41 09 80 8D AF 41 A2 02 8E 14 09 07
0718 42 4C 2B 29 AE AF 41 8E 14 42 20 52 06
0719 13 29 AE 16 42 18 6A B0 28 AD AF C7 06
0720 41 09 80 8D AF 41 A2 01 8E 14 42 9E 06
0721 4C 2B 29 AD 14 42 18 6A 8D 14 42 D9 05
0722 90 03 EE 16 42 EE 15 42 AE 15 42 F5 06
0723 E0 08 90 E9 60 60 AE 5B 41 E0 01 1F 08
0724 D0 08 AD AF 41 29 7F 8D AF 41 AD 1B 08
0725 AF 41 C9 20 B0 74 C9 08 D0 18 AE 39 08
0726 5B 41 E0 00 D0 09 AD 3A 41 8D AF 8F 07
0727 41 4C 7C 29 A9 14 8D AF 41 4C 7C 0B 07
0728 29 C9 0D D0 03 4C 7C 29 C9 14 D0 48 07
0729 13 AE 5B 41 E0 01 D0 03 4C 7C 29 DB 06
0730 AD 3A 41 8D AF 41 4C 7C 29 A2 00 12 07
0731 8E B2 41 AE 10 42 E0 01 F0 21 AE FC 07
0732 5B 41 E0 01 F0 03 4C 63 1D 4C F3 57 07
0733 1D A9 00 8D AF 41 A9 01 8D B2 41 4A 07
0734 AE 10 42 E0 01 F0 03 4C 88 29 AE 5D 07
0735 5B 41 E0 01 D0 03 4C 8B 0C 4C 36 94 06
0736 0E C9 5E D0 03 4C 7C 29 C9 5C D0 CE 07
0737 08 A9 20 8D AF 41 4C 7C 29 C9 7C 65 07
0738 D0 08 A9 7D 8D AF 41 4C 7C 29 C9 17 08
0739 7D D0 08 A9 7C 8D AF 41 4C 7C 29 CB 07
0740 C9 41 B0 03 4C 7C 29 AE 5B 41 E0 BC 07
0741 01 F0 03 4C 51 2A 29 7F 8D AF 41 C5 06
0742 C9 5B B0 08 09 80 8D AF 41 4C 7C 90 07
0743 29 C9 5F D0 08 A9 60 8D AF 41 4C E2 07
0744 7C 29 C9 60 D0 03 4C 95 29 C9 7B D7 07
0745 B0 08 29 DF 8D AF 41 4C 7C 29 C9 E0 07
0746 7F D0 10 CD 3A 41 F0 03 4C 95 29 8E 07
0747 A9 14 8D AF 41 4C 7C 29 C9 7B D0 2A 08
0748 08 A9 3C 8D AF 41 4C 7C 29 C9 7C 8C 07
0749 D0 08 A9 3E 8D AF 41 4C 7C 29 4C 66 07
0750 95 29 C9 5B B0 17 AD 18 D0 29 02 57 07
0751 C9 00 D0 03 4C 7C 29 AD AF 41 09 22 07
0752 20 8D AF 41 4C 7C 29 C9 5F D0 03 79 07
0753 4C 95 29 C9 60 D0 08 A9 5F 8D AF 40 08
0754 41 4C 7C 29 C9 7B B0 1C AD 18 D0 C9 07
0755 29 02 C9 00 F0 0B AD AF 41 29 DF 87 07
0756 8D AF 41 4C 7C 29 A9 20 8D AF 41 A8 07
0757 4C 7C 29 C9 7F B0 03 4C 97 2A C9 B7 07
0758 A1 B0 03 4C 95 29 C9 C1 B0 08 A9 3F 08
0759 20 8D AF 41 4C 7C 29 C9 DB 90 08 C1 07
0760 A9 20 8D AF 41 4C 7C 29 AD 18 D0 C4 07
0761 29 02 C9 00 F0 C9 AD AF 41 29 7F EB 07
0762 8D AF 41 4C 7C 29 0D 0D D4 52 41 E9 06
0763 4E 53 46 45 52 20 49 4E 20 50 52 F2 05
0764 4F 47 52 45 53 53 0D 0D 00 0D 20 16 05
0765 D4 52 41 4E 53 46 45 52 52 49 4E CB 06
0766 47 20 C2 4C 4F 43 4B 20 00 0D D7 54 06
0767 41 49 54 49 4E 47 00 0D 0D C5 4E E8 05
0768 44 20 4F 46 20 D4 52 41 4E 53 4D 6E 06
0769 49 53 53 49 4F 4E 0D 0D 00 0D 0D 0A 05
0770 C8 45 41 44 45 52 20 C5 52 52 4F 03 07
0771 52 0D 0D 00 0D 0D C3 48 45 43 4B 67 05
```


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Listing 1 continued.

```
0772 53 55 4D 20 C5 52 52 4F 52 0D 0D 3D 06
0773 00 0D 0D C2 4C 4F 43 4B 20 C9 C4 B7 06
0774 20 CD 49 53 4D 41 54 43 48 0D 0D 16 06
0775 00 0D D2 45 41 44 49 4E 47 0D 0D A8 05
0776 00 20 81 2C A2 00 8E 26 42 A2 00 0F 06
0777 8E 27 42 AE 3B 41 E0 00 F0 03 20 1D 07
0778 84 1F A9 42 8D 19 1C A9 26 8D 1A D0 06
0779 1C 20 0A 1C 20 4A 1C AE 78 26 8E CD 05
0780 86 41 8E 5E 41 A2 3A 8E 87 41 8E C0 07
0781 5F 41 A2 02 8E 4C 41 20 BC 1E AE 14 07
0782 36 41 A9 2C 9D 86 41 E8 AD CF 41 63 08
0783 9D 86 41 E8 A9 2C 9D 86 41 E8 A9 25 09
0784 57 9D 86 41 E8 A9 00 9D 86 41 8E 4E 08
0785 36 41 AE 3B 41 E0 00 F0 21 AE 76 C7 07
0786 26 8E 75 26 20 CC FF A9 0F 20 C3 E7 07
0787 FF 20 90 16 20 DB 17 AE 5A 41 E0 13 08
0788 01 D0 03 4C 32 35 4C ED 2C AE 1C CA 06
0789 42 E0 01 D0 0B 20 C4 2C A2 02 8E 55 07
0790 1A 42 20 EB 3D 4C 21 34 A2 01 8E 8C 06
0791 27 42 A9 42 8D 19 1C A9 26 8D 1A A3 06
0792 1C 20 0A 1C 20 4A 1C A2 00 8E 4C 7C 05
0793 41 20 BC 1E 20 4F 2C 20 DB 17 20 21 06
0794 A3 16 AE 5A 41 E0 01 D0 06 20 68 5B 07
0795 1C 4C 64 32 AE 3B 41 E0 00 F0 03 16 07
0796 4C 24 30 4C F4 38 A2 10 BD 86 41 6A 07
0797 E8 E8 E8 9D 86 41 9D 5E 41 CA CA 09 0A
0798 CA CA E0 FF D0 EC A9 24 8D 86 41 6E 0A
0799 AD 78 26 8D 87 41 A9 3A 8D 88 41 F8 07
0800 AE 36 41 E8 E8 E8 8E 36 41 4C D1 1F 09
0801 1F A9 0F 20 C3 FF AD 76 26 8D 75 25 08
0802 26 20 90 16 A2 00 8E 4C 41 AE 4C C5 06
0803 41 BD 5B 26 9D 86 41 EE 4C 41 AE 2F 08
0804 4C 41 E0 07 90 ED 8E 36 41 A9 00 C3 07
0805 8D 56 41 A9 5C 8D 57 41 20 B8 17 62 07
0806 AD 20 5C 8D D3 41 AD 21 5C 8D D4 7B 08
0807 41 60 A9 3B 8D 11 D0 A9 78 8D 18 E0 07
0808 D0 AD 00 DD 29 FE 8D 00 DD 60 A9 1C 09
0809 1B 8D 11 D0 A9 15 8D 18 D0 AD 00 92 07
0810 DD 09 01 8D 00 DD 20 2C 1C 60 A2 E5 06
0811 00 8E 2A 42 8E 2B 42 A2 01 8E 1E 6F 06
0812 42 20 8F 32 A2 00 8E 1E 42 A2 00 81 06
0813 8E 1F 42 8E 24 42 8E 21 42 8E 22 B1 06
0814 42 8E 23 42 A2 84 8E 25 42 A2 30 50 07
0815 8E 20 42 A2 01 8E 26 42 A2 83 8E 6B 07
0816 2E 42 A2 00 8E 29 42 20 1C 1D 20 B4 05
0817 7B 32 A2 00 8E 48 42 8E 49 42 20 D1 06
0818 E2 1A 20 DD 32 20 9D 1D 4C 95 2D 45 07
0819 AD AF 41 C9 00 F0 F3 C9 01 D0 2A 40 09
0820 A2 00 8E 2A 42 AE 28 42 E0 00 F0 B8 07
0821 09 AD AF 41 8D 00 5A 4C 6C 2D AD 54 07
0822 AF 41 8D 00 5B 20 F0 33 20 23 33 C7 06
0823 20 03 34 20 C2 32 4C 06 2E C9 04 EF 05
0824 D0 08 A2 01 8E 2A 42 4C 9E 2F C9 8F 07
0825 03 D0 03 4C B2 2D C9 18 D0 03 4C 3A 07
0826 B2 2D 20 C3 1A AE 4A 41 E0 01 F0 20 08
0827 0D 20 CC FF 20 E4 FF C9 18 F0 09 10 09
0828 4C 46 2D 20 4E 32 4C 2C 2D 20 1C 7C 05
0829 1D A9 18 8D AF 41 20 AF 1D A9 03 30 07
0830 8D AF 41 20 AF 1D 20 D7 2C 20 CC B6 07
0831 FF A9 03 20 C3 FF 20 68 1C A2 00 12 08
0832 8E 55 41 8E 2B 42 8E 26 42 8E 2C 0F 07
0833 42 8E 28 42 8E 2A 42 AE 12 42 8E 05 07
0834 3B 41 20 CC FF A9 0F 20 C3 FF AD F0 08
0835 76 26 8D 75 26 20 90 16 A2 00 8E FD 06
0836 1A 42 4C E5 0B A2 01 8E 24 42 A2 15 07
0837 00 8E 29 42 20 FE 1A 20 9D 1D AD FD 06
0838 97 02 29 08 C9 00 D0 2A AE 28 42 EB 06
0839 E0 01 F0 0C AE 24 42 AD AF 41 9D 72 08
0840 00 5A 4C 3B 2E AE 24 42 AD AF 41 08 07
0841 9D 00 5B EE 24 42 AE 24 42 EC 25 BA 07
0842 42 90 10 4C 5C 2E 20 C3 1A AE 4A F7 06
0843 41 E0 01 D0 C0 4C 18 34 20 F0 33 D8 07
0844 4C 10 2E AE 28 42 E0 01 F0 2B AE 98 07
0845 01 5A 8E DA 41 EC 1F 42 D0 03 4C BD 07
0846 A7 2E AE 1F 42 CA EC DA 41 D0 22 F5 08
0847 A2 00 8E 29 42 20 7B 33 20 03 34 0F 06
0848 20 1C 1D 20 3F 32 4C 32 2D AE 01 94 05
0849 5B 8E DA 41 EC 1F 42 D0 D8 4C A7 3D 09
0850 2E 20 15 33 A2 00 8E 2B 42 4C 18 E9 05
0851 34 A2 83 8E 4C 41 AE 28 42 E0 01 C0 07
0852 F0 0C AE 4C 41 BD 00 5A 8D AF 41 1F 08
0853 4C C8 2E AE 4C 41 BD 00 5B 8D AF 26 08
0854 41 AD AF 41 CD 48 42 F0 06 20 07 A8 07
0855 33 4C 18 34 AE 28 42 E0 01 F0 12 1D 07
0856 18 AD 00 5A 6D 01 5A 18 6D 02 5A 20 06
0857 C9 00 D0 12 4C 04 2F 18 AD 00 5B A3 06
0858 6D 01 5B 18 6D 02 5B C9 00 F0 06 C4 06
0859 20 F9 32 4C 18 34 A2 03 8E 4C 41 FE 06
0860 20 CC FF A2 03 20 C9 FF AE 2C 42 F0 08
0861 E0 01 F0 08 A2 01 8E 17 42 4C 81 8D 07
0862 2F AE 28 42 E0 00 F0 0C AE 4C 41 BC 07
0863 BD 00 5A 20 D2 FF 4C 69 2F AE 17 10 08
0864 42 E0 01 D0 26 A2 00 8E 17 42 AE B0 07
0865 03 5B E0 04 D0 1A AE 04 5B E0 00 7A 07
0866 D0 13 AE 05 5B E0 43 D0 0C AE 06 06 08
0867 5B E0 43 D0 05 A2 09 8E 4C 41 AE 2A 08
0868 4C 41 BD 00 5B 20 D2 FF EE 4C 41 75 08
0869 AE 4C 41 EC 2E 42 90 95 20 A3 16 FA 07
0870 AE 5A 41 E0 01 D0 03 4C B2 2D A2 30 08
0871 01 8E 2C 42 20 CC FF 20 1C 1D 20 C8 06
0872 3F 32 AE 2A 42 E0 01 F0 7D A2 00 E3 07
0873 8E 29 42 4C 32 2D A2 82 8E 2E 42 2F 07
0874 AE 28 42 E0 01 F0 0C AE 2E 42 BD 3A 08
0875 00 5A 8D DA 41 4C BF 2F AE 2E 42 C5 07
0876 BD 00 5B 8D DA 41 CE 2E 42 AE 28 40 08
0877 42 E0 01 F0 0E AE 2E 42 BD 00 5A C3 07
0878 CD DA 41 F0 EB 4C E2 2F AE 2E 42 AC 09
0879 BD 00 5B CD DA 41 F0 DD EE 2E 42 9A 09
0880 AE DA 41 E0 00 D0 10 AE CF 41 E0 97 09
0881 50 D0 09 EE 2E 42 EE 2E 42 EE 2E 72 08
0882 42 AE 28 42 E0 00 F0 08 A2 00 8E D4 07
0883 28 42 4C 10 30 A2 01 8E 28 42 4C 50 06
0884 04 2F 20 CC FF A9 03 20 C3 FF 20 40 08
0885 2C 1C 20 00 1D 4C D3 2D A2 1A 8E 90 06
0886 7A 26 A2 00 8E 1F 42 8E 21 42 8E 26 07
0887 22 42 8E 23 42 8E 24 42 8E 2A 42 BC 06
0888 8E 29 42 8E 2C 42 A2 30 8E 20 42 2F 07
0889 A2 83 8E 25 42 A2 01 8E 32 42 8E C6 07
0890 27 42 20 E2 33 A2 00 8E 48 42 8E 60 07
0891 49 42 A9 01 8D 00 5B 8D AF 41 20 35 07
0892 F0 33 20 23 33 AD 1F 42 8D 01 5B 0C 07
0893 8D AF 41 20 F0 33 38 A9 FF ED 1F 29 09
0894 42 8D 02 5B 8D AF 41 20 F0 33 A2 0C 08
0895 03 8E 4F 26 20 CC FF A2 03 20 C6 FB 07
0896 FF 20 E4 FF 8D AF 41 20 CC FF AE 98 0A
0897 4F 26 AD AF 41 9D 00 5B 20 F0 33 CE 07
0898 20 4F 1B AD 37 41 C9 00 F0 08 A2 94 07
0899 01 8E 2A 42 4C D2 30 EE 4F 26 AE DD 07
0900 4F 26 E0 83 90 C7 AD 48 42 A2 83 0F 09
0901 9D 00 5B 4C 00 31 AE 4F 26 BD 00 DA 06
0902 5B C9 1A D0 05 A9 00 8D 7A 26 EE 5D 08
0903 4F 26 AE 4F 26 AD 7A 26 9D 00 5B 64 07
0904 8D AF 41 20 F0 33 EE 4F 26 AE 4F A8 08
0905 26 E0 83 90 E7 4C C7 30 AE 32 42 EE 08
0906 E0 01 D0 3D 20 1C 1D 20 41 1B 20 6D 06
0907 9D 1D AD 97 02 29 08 C9 00 D0 1E 73 07
0908 AD AF 41 C9 03 D0 03 4C 64 32 C9 73 08
0909 18 D0 03 4C 64 32 CD 7B 26 D0 08 A0 07
0910 A2 00 8E 32 42 4C 44 31 20 30 1B 5E 06
0911 AE 4A 41 E0 01 D0 CC 4C 64 32 A2 C9 08
0912 00 8E 29 42 20 C2 32 A2 00 8E 4F 1C 07
0913 26 AE 4F 26 BD 00 5B 8D AF 41 20 8F 07
0914 AF 1D EE 4F 26 AE 4F 26 E0 84 90 D8 08
0915 EA 20 1C 1D 20 E2 1A 20 CC FF 20 FD 07
0916 E4 FF C9 18 D0 09 8D AF 41 20 AF 7D 09
0917 1D 4C 64 32 20 9D 1D AD 97 02 29 DD 06
0918 08 C9 00 D0 38 AD AF 41 C9 03 D0 A8 08
0919 03 4C 64 32 C9 18 D0 03 4C 64 32 12 07
```

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Listing 1 continued.

```
0920 CD 7B 26 D0 06 20 4E 32 4C 49 31 42 07
0921 CD 7C 26 D0 C0 A2 00 8E 29 42 AE E1 08
0922 2A 42 E0 01 F0 03 4C 55 30 A2 01 4E 07
0923 8E 2C 42 4C D7 31 20 C3 1A AE 4A E0 07
0924 41 E0 01 D0 9F 20 DD 32 20 4E 32 FC 07
0925 4C 49 31 A2 00 8E 29 42 20 DD 32 2D 07
0926 20 1C 1D 20 E2 1A 20 85 32 20 9D A7 06
0927 1D AD 97 02 29 08 C9 00 D0 16 AD 8F 07
0928 AF 41 CD 7B 26 D0 06 20 4E 32 4C C0 07
0929 DC 31 CD 7C 26 D0 03 4C 23 32 20 B1 07
0930 C3 1A AE 4A 41 E0 01 F0 03 4C E8 C0 08
0931 31 20 DD 32 20 4E 32 20 E2 1A 4C 0B 07
0932 E8 31 20 CC FF A9 03 20 C3 FF A2 D8 09
0933 00 8E 2A 42 8E 2C 42 20 0C 1B 20 02 06
0934 2C 1C 20 00 1D 4C D3 2D AD 7C 26 C6 06
0935 8D AF 41 20 AF 1D A2 00 8E 29 42 AB 07
0936 60 EE 29 42 AE 29 42 E0 0A 90 22 16 08
0937 68 68 AE 27 42 E0 00 D0 03 4C B2 41 08
0938 2D 20 CC FF A9 03 20 C3 FF A9 18 11 09
0939 8D AF 41 20 AF 1D 20 68 1C 4C D3 D7 07
0940 2D 60 AD 7B 26 8D AF 41 20 AF 1D F0 07
0941 60 AD 74 26 8D AF 41 20 AF 1D 60 1D 08
0942 A9 D9 8D 19 1C A9 2A 8D 1A 1C 20 A8 07
0943 0A 1C AE 1E 42 E0 01 D0 1E A2 00 54 07
0944 8E 4C 41 AE 4C 41 BD 53 3E 8D AF 90 08
0945 41 20 AF 1D EE 4C 41 AD AF 41 C9 BF 08
0946 00 F0 03 4C A8 32 60 A9 F2 8D 19 6C 08
0947 1C A9 2A 8D 1A 1C 20 0A 1C A9 20 74 06
0948 8D 19 1C A9 42 8D 1A 1C 20 0A 1C 6A 06
0949 60 A9 08 8D 19 1C A9 2B 8D 1A 1C 1F 07
0950 20 0A 1C 60 A9 11 8D 19 1C A9 2B AC 06
0951 8D 1A 1C 20 0A 1C 60 A9 29 8D 19 98 06
0952 1C A9 2B 8D 1A 1C 20 0A 1C 60 A9 BA 06
0953 3A 8D 19 1C A9 2B 8D 1A 1C 20 0A 76 06
0954 1C 60 A9 4D 8D 19 1C A9 2B 8D 1A 69 07
0955 1C 20 0A 1C 60 EE 1F 42 AD 20 42 DB 06
0956 8D B3 41 AD 21 42 8D B4 41 AD 22 9E 08
0957 42 8D B5 41 A9 00 8D B6 41 8D B7 F3 08
0958 41 8D B8 41 20 3F 1E AD B3 41 8D 30 08
0959 20 42 AD B4 41 8D 21 42 AD B5 41 56 08
0960 8D 22 42 AE 20 42 E0 32 D0 1B AE 6C 08
0961 21 42 E0 35 D0 14 AE 22 42 E0 36 45 08
0962 D0 0D A2 30 8E 20 42 A2 00 8E 21 B2 07
0963 42 8E 22 42 60 AE 1F 42 E0 00 F0 36 08
0964 5C CE 1F 42 A2 02 8E BC 41 AE BC E8 08
0965 41 BD 20 42 C9 00 D0 0D CE BC 41 96 08
0966 AE BC 41 E0 FF F0 CF 4C 8A 33 AE C6 0A
0967 BC 41 BD 20 42 C9 30 D0 0E A9 39 9C 08
0968 AE BC 41 9D 20 42 CE BC 41 4C A1 2A 09
0969 33 AA CA 8A AE BC 41 9D 20 42 AD 51 09
0970 20 42 C9 30 D0 15 AD 21 42 C9 00 E3 07
0971 F0 0E 8D 20 42 AD 22 42 8D 21 42 B9 07
0972 A9 00 8D 22 42 20 03 34 60 A9 63 29 07
0973 8D 19 1C A9 2B 8D 1A 1C 20 0A 1C 6C 06
0974 60 18 AD 48 42 6D AF 41 8D 48 42 F1 07
0975 AD 49 42 69 00 8D 49 42 60 18 AD AD 07
0976 1F 42 6A B0 08 A2 00 8E 28 42 4C 39 07
0977 17 34 A2 01 8E 28 42 60 20 7B 33 E5 06
0978 20 03 34 4C 2C 2D A2 00 8E 2A 42 6A 06
0979 8E 2B 42 A2 00 8E 1E 42 20 8F 32 3F 07
0980 A2 00 8E 1E 42 A2 00 8E 1F 42 8E 83 07
0981 24 42 8E 21 42 8E 22 42 8E 1B 42 09 07
0982 8E 28 42 8E 36 42 8E 3A 42 8E 23 8F 07
0983 42 A2 30 8E 20 42 A2 01 8E 26 42 74 07
0984 8E 32 42 A2 00 8E 29 42 20 1C 1D CE 06
0985 20 7B 32 A2 00 8E 48 42 8E 49 42 79 07
0986 20 E2 1A 20 DD 32 20 9D 1D AD 97 43 08
0987 02 29 08 C9 00 F0 03 4C 15 35 AD 0D 07
0988 AF 41 C9 00 F0 EA C9 01 D0 21 A2 CC 09
0989 00 8E 2A 42 A2 00 8E 36 42 A2 FF 20 08
0990 8E 25 42 AE 32 42 E0 01 F0 03 4C 15 08
0991 CC 34 A2 07 8E 25 42 4C DC 34 C9 A2 08
0992 02 D0 43 A2 00 8E 2A 42 A2 01 8E C2 07
0993 36 42 A2 09 8E 25 42 A2 08 8E 47 78 07
0994 42 AE 28 42 E0 00 F0 09 AD AF 41 B2 08
0995 8D 00 5A 4C EC 34 AD AF 41 8D 00 60 08
0996 5B AE 32 42 E0 01 D0 03 4C 59 35 EF 07
0997 20 F0 33 20 23 33 20 03 34 20 C2 D7 06
0998 32 4C 59 35 C9 04 D0 08 A2 01 8E C8 07
0999 2A 42 4C B5 38 C9 03 D0 03 4C 32 A9 07
1000 35 C9 18 D0 03 4C 32 35 20 C3 1A 81 07
1001 AE 4A 41 E0 01 F0 0D 20 CC FF 20 0B 09
1002 E4 FF C9 18 F0 09 4C 88 34 20 4E 1D 09
1003 32 4C 65 34 20 1C 1D A9 18 8D AF 58 07
1004 41 20 AF 1D A9 03 8D AF 41 20 AF 11 08
1005 1D 20 D7 2C 20 CC FF A9 03 20 C3 A7 08
1006 FF 20 60 17 20 68 1C 4C D3 2D A2 16 08
1007 01 8E 24 42 A2 00 8E 29 42 20 FE 9D 07
1008 1A 20 9D 1D AD 97 02 29 08 C9 00 24 07
1009 D0 51 AE 32 42 E0 01 F0 13 AE 28 EE 08
1010 42 E0 01 F0 0C AE 24 42 AD AF 41 C2 08
1011 9D 00 5A 4C 95 35 AE 24 42 AD AF 70 08
1012 41 9D 00 5B AE 32 42 E0 01 F0 19 39 08
1013 AE 24 42 E0 03 D0 12 AE 36 42 E0 D4 08
1014 01 F0 0B AD AF 41 8D 25 42 AA CA F7 08
1015 8E 47 42 EE 24 42 AE 24 42 EC 25 87 08
1016 42 90 10 4C 8D 36 20 C3 1A AE 4A DE 07
1017 41 E0 01 D0 99 4C 9A 3D AE 32 42 C9 08
1018 E0 01 F0 0B AE 24 42 EC 47 42 B0 0F 09
1019 03 20 F0 33 4C 63 35 AE 1A 42 E0 0F 08
1020 01 D0 03 4C 67 36 38 A9 FF ED 01 87 08
1021 5B CD 04 5B F0 03 4C 65 34 38 A9 3D 08
1022 FF ED 02 5B CD 05 5B F0 03 4C 65 18 09
1023 34 38 A9 FF ED 03 5B CD 06 5B F0 7C 09
1024 03 4C 65 34 AD 02 5B CD D4 41 90 64 08
1025 1D F0 10 A9 6C 8D 19 1C A9 3E 8D 69 08
1026 1A 1C 20 0A 1C 4C 32 35 AD 02 5B 3B 06
1027 CD D3 41 90 03 4C 23 36 AE 1A 42 26 08
1028 E0 01 D0 03 4C 67 36 AE 36 41 CA 90 08
1029 CA CA AD 03 5B 8D CF 41 9D 86 41 A5 09
1030 20 DB 17 20 A3 16 AE 5A 41 E0 01 1B 08
1031 D0 03 4C 32 35 A2 00 8E 32 42 A2 D3 07
1032 01 8E DB 41 A2 00 8E 28 42 8E 1F FA 07
1033 42 8E 21 42 8E 22 42 A9 30 8D 20 B4 07
1034 42 20 1C 1D 20 3F 32 4C 6B 34 AE CF 06
1035 32 42 E0 01 D0 03 4C E5 35 AE 28 6F 08
1036 42 E0 01 F0 0E 38 A9 FF ED 03 5A 57 09
1037 CD 04 5A F0 11 4C A2 37 38 A9 FF 3E 09
1038 ED 03 5B CD 04 5B F0 03 4C A2 37 9D 08
1039 AE 28 42 E0 01 F0 2E AE 01 5A 8E BD 08
1040 DA 41 EC 1F 42 D0 03 4C 08 37 AE 84 08
1041 1F 42 CA EC DA 41 D0 25 A2 00 8E 68 09
1042 29 42 20 7B 33 20 03 34 20 15 33 0A 06
1043 20 1C 1D 20 3F 32 4C 6B 34 AE 01 97 06
1044 5B 8E DA 41 EC 1F 42 D0 D5 4C 08 5E 09
1045 37 20 15 33 A2 00 8E 2B 42 4C 9A 37 07
1046 3D AE 25 42 CA CA 8E 4C 41 8E 25 CA 08
1047 42 AE 28 42 E0 01 F0 18 AE 4C 41 95 08
1048 BD 00 5A 8D AF 41 EE 4C 41 AE 4C 21 09
1049 41 BD 00 5A 8D DA 41 4C 47 37 AE 91 08
1050 4C 41 BD 00 5B 8D AF 41 EE 4C 41 B7 08
1051 AE 4C 41 BD 00 5B 8D DA 41 AD AF 72 09
1052 41 CD 48 42 D0 0B AD DA 41 CD 49 6D 09
1053 42 D0 03 4C 60 37 20 07 33 4C 9A 55 07
1054 3D AE 28 42 E0 01 F0 1F 18 AD 00 28 08
1055 5A 6D 01 5A 18 6D 02 5A 8D AF 41 9F 07
1056 AE 36 42 E0 01 F0 2C AD AF 41 C9 A9 09
1057 00 D0 1F 4C 00 38 18 AD 00 5B 6D 21 07
1058 01 5B 18 6D 02 5B 8D AF 41 AE 36 C1 07
1059 42 E0 01 F0 0D AD AF 41 C9 00 F0 99 09
1060 5E 20 F9 32 4C 9A 3D AD AF 41 C9 56 09
1061 01 D0 F3 4C 00 38 A2 00 8E 4C 41 2A 08
1062 AE 25 42 E8 E8 8E 25 42 AE 1A 42 0A 09
1063 E0 01 F0 08 20 CC FF A2 03 20 C9 79 09
1064 FF AD AF 41 20 A3 3D AE 1A 42 E0 AE 09
1065 01 F0 09 AD AF 41 20 D2 FF 20 CC 9D 09
1066 FF EE 4C 41 AE 4C 41 EC 25 42 90 C2 09
1067 D0 4C 9D 38 A2 00 8E DB 41 20 1C A4 08
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Print method: Bi-directional impact dot matrix.
Character matrix: 6 x 7 dot matrix.
Characters: Upper and lower case letters, numerals and symbols. All PET graphic characters.
Graphics: 7 vertical dots — maximum 480 columns. Dot addressable.
Character codes: CBM ASCII code.
Print speed: 60 characters per second.
Maximum columns: 80 columns.
Character spacing: 10 characters per inch.
Line feed spacing: 6 lines per inch in character mode or 8 lines per inch selectable. 9 lines per inch in graphics mode.
Line feed speed: 5 lines per second in character mode. 7.5 lines per second in graphics mode.
Paper feed: Friction feed.
Paper width: 4.5" to 8.5" width.
Multiple copies: Original plus maximum of two copies.
Dimensions: 13"W x 8"D x 3¼"H. Wt.: 6½ lbs. **Power:** 120V AC, 60 Hz.

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Listing 1 continued.

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1068 1D 20 3F 32 4C 6B 34 AE 28 42 E0 BD 07
1069 00 F0 1F AE DB 41 E0 01 F0 E4 AE 69 0A
1070 03 5A CA CA 8E 25 42 AD 05 5A 8D AD 08
1071 AF 41 AD 00 5A C9 02 F0 8F 4C 3E FA 08
1072 38 AE 03 5B CA CA 8E 25 42 AD 05 AF 08
1073 5B 8D AF 41 AD 00 5B C9 02 D0 03 AF 08
1074 4C B2 37 A2 05 8E 4C 41 AE 1A 42 33 08
1075 E0 01 F0 08 20 CC FF A2 03 20 C9 85 09
1076 FF AE 28 42 E0 00 F0 09 AE 4C 41 5F 09
1077 BD 00 5A 4C 68 38 AE 4C 41 BD 00 30 08
1078 5B 8D AF 41 AE 1A 42 E0 00 F0 0A F2 08
1079 20 A3 3D AE 1A 42 E0 01 F0 09 AD C8 08
1080 AF 41 20 D2 FF 20 CC FF EE 4C 41 7F 0A
1081 AE 4C 41 EC 25 42 90 B3 20 A3 16 E3 08
1082 AE 5A 41 E0 01 D0 03 4C 32 35 20 0A 08
1083 CC FF 20 1C 1D 20 3F 32 AE 2A 42 0A 08
1084 E0 01 F0 1F A2 00 8E 29 42 4C 6B 7E 08
1085 34 AE 28 42 E0 00 F0 08 A2 00 8E 91 08
1086 28 42 4C C9 38 A2 01 8E 28 42 4C DC 07
1087 00 38 20 CC FF A9 03 20 C3 FF AE 9E 09
1088 1A 42 E0 00 F0 10 20 0C 1B A2 00 65 07
1089 8E 1A 42 A9 0D 8D AF 41 20 AF 1D 4A 08
1090 20 D7 2C 20 00 1D 4C D3 2D A2 01 91 07
1091 8E 1E 42 20 8F 32 A2 00 8E 1E 42 A2 07
1092 8E 3C 42 A2 1A 8E 7A 26 A2 00 8E 6A 08
1093 1F 42 8E 21 42 8E 22 42 8E 39 42 92 07
1094 8E 23 42 8E 24 42 8E 2A 42 8E 29 DE 07
1095 42 8E 2C 42 8E 46 42 8E 48 42 8E 41 08
1096 49 42 A2 30 8E 20 42 A2 83 8E 25 6D 08
1097 42 A2 01 8E 32 42 8E 27 42 A2 05 CE 07
1098 8E 38 42 A9 01 8D 00 5A AD B8 41 89 08
1099 8D 01 5A 38 A9 FF ED B8 41 8D 04 8A 09
1100 5A AD B9 41 8D 02 5A 38 A9 FF ED 03 0A
1101 B9 41 8D 05 5A AD CF 41 8D 03 5A DA 08
1102 38 A9 FF ED CF 41 8D 06 5A A2 07 C1 09
1103 8E 25 42 4C 92 3B AE 2A 42 E0 01 58 08
1104 D0 03 4C F7 39 A2 00 8E 33 42 8E D2 08
1105 34 42 8E 35 42 8E 36 42 8E 37 42 D9 07
1106 8E 3A 42 8E 3B 42 8E 48 42 8E 49 56 08
1107 42 20 E2 33 AE 38 42 8E 4F 26 20 15 08
1108 CC FF A2 03 20 C6 FF 20 E4 FF 8D 39 0B
1109 AF 41 20 CC FF AE 4F 26 AD AF 41 F0 09
1110 9D 00 5B 20 4F 1B AD 37 41 C9 00 C6 07
1111 F0 12 A2 01 8E 2A 42 AE 4F 26 8E A7 08
1112 39 42 E8 8E 3C 42 4C F7 39 EE 4F 80 09
1113 26 AE 4F 26 E0 FD 90 C0 8E 3C 42 DB 09
1114 CA 8E 39 42 A2 05 8E 4F 26 AE 4F D4 08
1115 26 8E 35 42 BD 00 5B 8D 33 42 A2 42 08
1116 01 8E 34 42 EE 4F 26 AE 4F 26 BD A4 08
1117 00 5B CD 33 42 F0 29 38 AD 35 42 6F 08
1118 E9 05 18 6D 34 42 C9 11 90 D3 AE 32 09
1119 34 42 E0 0A B0 2C AE 4F 26 EC 39 E3 08
1120 42 90 C4 AE 3C 42 8E 35 42 8E 37 EC 08
1121 42 4C 99 3A EE 34 42 AE 4F 26 EC 35 09
1122 39 42 90 BE AE 34 42 E0 0A B0 03 EC 08
1123 4C 38 3A EE 4F 26 AE 4F 26 8E 37 6C 08
1124 42 AD 33 42 8D 42 42 38 A9 FF ED A6 09
1125 33 42 8D 43 42 38 A9 FF ED 34 42 2F 09
1126 8D 41 42 AD 34 42 8D 40 42 A9 02 53 08
1127 8D 3D 42 A2 01 8E 36 42 20 23 33 92 07
1128 20 23 33 20 8A 3D 20 7B 33 20 7B 2E 07
1129 33 A2 00 8E 48 42 8E 49 42 AE 35 52 08
1130 42 E0 05 F0 31 A9 01 8D 00 5A 8D D0 08
1131 AF 41 20 F0 33 20 23 33 AD 1F 42 22 08
1132 8D 01 5A 8D AF 41 20 F0 33 38 A9 F5 08
1133 FF ED 1F 42 8D 02 5A 8D AF 41 20 40 09
1134 F0 33 A2 05 8E 4C 41 4C E7 3A A2 62 09
1135 01 8E 3A 42 20 23 33 20 8A 3D 4C 23 07
1136 37 3B AE 4C 41 BD 00 5B 9D 00 5A 2C 08
1137 8D AF 41 20 F0 33 EE 4C 41 AE 4C A6 09
1138 41 EC 35 42 90 E6 AE 4C 41 E8 E8 97 0A
1139 8E AF 41 8E 03 5A 20 F0 33 38 A9 00 09
1140 FF ED AF 41 8D 04 5A 8D AF 41 20 D8 09
1141 F0 33 AE 4C 41 AD 48 42 9D 00 5A 01 09
1142 E8 AD 49 42 9D 00 5A E8 8E 25 42 6A 09
1143 A2 00 8E 3A 42 A2 05 8E 4C 41 AE 93 08
1144 37 42 8E 4F 26 EC 3C 42 90 08 A2 98 08
1145 05 8E 38 42 4C 92 3B AE 4F 26 BD 7F 08
1146 00 5B AE 4C 41 9D 00 5B EE 4F 26 6B 08
1147 EE 4C 41 AE 4F 26 EC 3C 42 90 E6 F9 09
1148 A2 01 8E 46 42 AE 4C 41 8E 3C 42 7C 08
1149 8E 38 42 CA 8E 39 42 AE 4C 41 A9 3C 09
1150 00 9D 00 5B EE 4C 41 E0 FD 90 F1 4F 0A
1151 A2 00 8E 48 42 8E 49 42 AE 32 42 74 08
1152 E0 01 D0 51 20 41 1B 20 CC FF 20 09 09
1153 E4 FF C9 18 D0 0C 8D AF 41 20 AF 6D 0A
1154 1D 20 D7 2C 4C 64 32 20 9D 1D AD 2B 08
1155 97 02 29 08 C9 00 D0 1C AD AF 41 9F 08
1156 C9 03 D0 03 4C 64 32 C9 18 D0 06 BC 08
1157 20 D7 2C 4C 64 32 CD 7B 26 D0 03 CB 08
1158 4C EA 3B 20 30 1B AE 4A 41 E0 01 7C 08
1159 D0 B8 20 D7 2C 4C 64 32 A2 00 8E 44 09
1160 29 42 AE 32 42 E0 00 F0 03 4C FC 30 09
1161 3B 20 C2 32 AE 3A 42 E0 01 D0 03 B6 08
1162 4C 25 3C A2 00 8E 24 42 AE 24 42 E1 07
1163 BD 00 5A 8D AF 41 20 AF 1D EE 24 1D 09
1164 42 AE 24 42 EC 25 42 90 E9 4C 79 73 09
1165 3C AE 3B 42 E0 01 F0 32 A2 00 8E 27 09
1166 4C 41 8E 48 42 8E 49 42 AE 4C 41 87 08
1167 BD 3D 42 8D AF 41 20 F0 33 EE 4C C5 09
1168 41 AE 4C 41 E0 07 90 EA AD 48 42 A4 09
1169 8D 44 42 AD 49 42 8D 45 42 A2 01 93 08
1170 8E 3B 42 A2 00 8E 24 42 AE 24 42 47 08
1171 BD 3D 42 8D AF 41 20 AF 1D EE 24 4A 09
1172 42 AE 24 42 E0 09 90 EA 20 E2 1A 69 09
1173 20 CC FF 20 E4 FF C9 18 D0 0C 8D CD 0A
1174 AF 41 20 AF 1D 20 D7 2C 4C 64 32 77 08
1175 20 9D 1D AD 97 02 29 08 C9 00 D0 81 08
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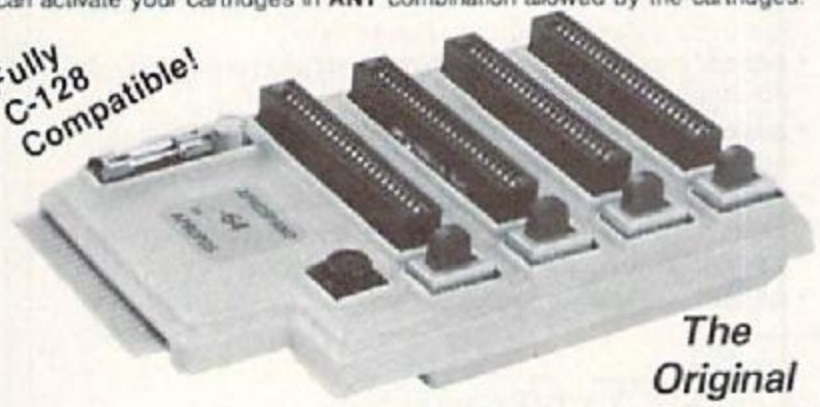

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1177 C9 18 D0 06 20 D7 2C 4C 64 32 CD 22 09
1178 7B 26 D0 06 20 4E 32 4C EF 3B CD F4 08
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1180 42 AE 36 42 E0 01 D0 1A A2 00 8E FF 08
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1216 CB 2E 20 D4 52 41 4E 53 46 45 52 BE 08
1217 20 54 48 45 20 46 49 4C 45 2E 0D 3D 07
1218 00 0D 3E C6 49 4C 45 20 D7 4F 4E 41 08
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1220 D4 52 41 4E 53 4D 49 53 53 49 4F A0 08
1221 4E 20 C7 41 52 42 4C 45 44 3C 0D ED 07
1222 00 0D 0D 20 31 29 20 C3 C2 CD 20 EC 07
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1224 D3 54 41 4E 44 41 52 44 20 C1 D3 4D 09
1225 C3 C9 C9 0D 0D 00 0D 0D C3 D4 D2 BB 09
1226 CC 2D D8 20 54 4F 20 43 41 4E 43 93 08
1227 45 4C 0D D5 50 4C 4F 41 44 20 4F 1D 08
1228 52 20 44 4F 57 4E 4C 4F 41 44 3F D5 07
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1236 29 20 C3 41 4C 4C 20 C4 45 4C 50 7E 08
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1238 0D 20 20 20 33 29 20 C3 41 4C 4C 5B 07
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1240 4C 45 58 20 C2 C2 D3 20 55 53 49 49 09
1241 4E 47 0D 20 20 20 20 20 20 C3 4F 4D 07
1242 4D 4D 4F 44 4F 52 45 20 C1 D3 C3 64 09
1243 C9 C9 0D 0D 20 20 20 34 29 20 C3 27 08
1244 41 4C 4C 20 41 20 46 55 4C 4C 2D 96 07
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1251 52 45 20 C1 D3 C3 C9 C9 0D 0D 20 BD 09
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1276 3F 20 00 0D C6 49 4E 45 2E 0D 0D 52 07
1277 C9 4E 53 45 52 54 20 54 48 45 20 73 08
1278 47 41 4D 45 20 44 49 53 4B 2E 0D 9E 07
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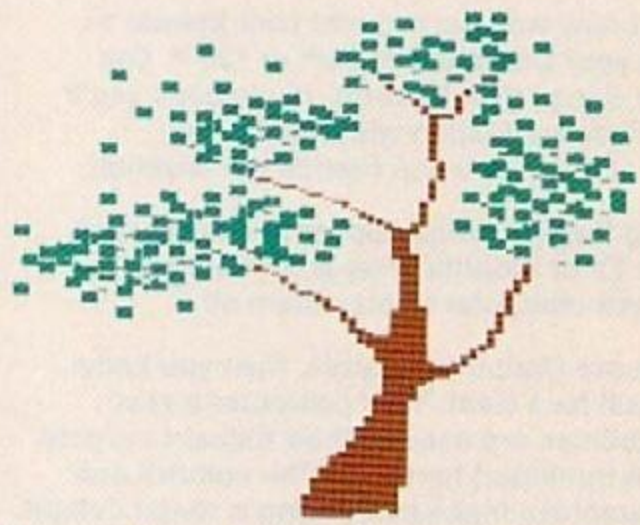

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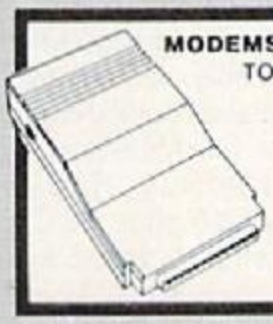

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RUN Magazine Says . . .

Tom Benford of RUN notes "Whenever a selection of products of the same genre is available, one among the bunch rises head and shoulders above the rest. Such is the case with Melodian ConcertMaster keyboard and software. The combined features of RhythmMaster and ConcertMaster give you a complete music tutorial."

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Three track sequencer (recorder) with overdubbing and multitimbral (different instrument sounds at the same time) effects.

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Power Supply
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With the ScoreMaster program your music can be printed out in music notation, which other musicians can read and play. Any music recorded with the ConcertMaster program can be printed by ScoreMaster.

ScoreMaster Requires:
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- Melodian ConcertMaster program.

RhythmMaster Software rm-01 $29.95

RhythmMaster teaches a beginner how to read music and play it correctly and in rhythm on the musical keyboard.

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- Built in metronome.
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RhythmMaster Teaches:
- How to read notes on the treble and bass musical staffs.
- The names of the notes.
- Where the notes are on the keyboard.
- How to play whole notes, half notes, quarter notes, eighth notes and sixteenth notes in combinations, in both 3/4 and 4/4 time.
- How to play in different tempos.

RhythmMaster Requires:
- Commodore 64 or Commodore 128 with disk drive.
- Melodian Musical Keyboard kb-01 is required to study the reading and playing of musical notes. However, RhythmMaster can be used without the Melodian Musical Keyboard to study rhythm, by playing the notes on the computer keyboard.

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ConcertMaster Requires:
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Auto-Run

Protect your programs from prying eyes with this handy utility that instantly begins execution of your programs after they are loaded.

By ALEJANDRO KAPAUAN

Some professional software houses feature programs that automatically run when they are loaded into the computer. This makes the programs easier to use and protects them from being listed and examined.

Now, you, too, can make your programs self-running with Auto-Run, which allows them to begin execution the moment you load them.

Self-running programs must be loaded with the "1" command of the Load statement, as in LOAD"PROGRAM",8,1. After the program is loaded, it starts execution.

If you load the program without the "1" command, it will not automatically start execution; however, you can neither list nor save the program to produce a working copy.

Self-running programs are possible due to various operating system subroutine vectors in low memory. You can change these vectors to point to machine language routines. Auto-Run creates a program file that actually loads right over these vectors.

One important vector, the warm-start link at location $0302–$0303, is changed to point to a small machine language routine in the cassette buffer. After the program loads, this new warm-start routine issues a Run command to Basic and starts execution of the program.

Program Details

Auto-Run (see Listing 1) starts off by printing a header on the screen and Poking the auto-start machine language routine into the cassette buffer. The sum of the data in the Data statements is checked against a checksum to ensure accuracy.

At line 50, the program asks for the filename of the program for which an auto-start copy is to be made. The program file is then opened for reading.

At line 80, you are asked for the name to be given the output file; that is, the auto-start version of the program. The output file is then opened for writing.

At line 110, the machine language routine in the cassette buffer is customized for the machine the program is running on—C-64 or VIC-20.

At line 130, the first two bytes, which represent the start address of the program file in low-byte, high-byte format, are read from the input file. These two bytes will vary, depending on whether the machine is an unexpanded or expanded VIC or a Commodore 64. The variable L is

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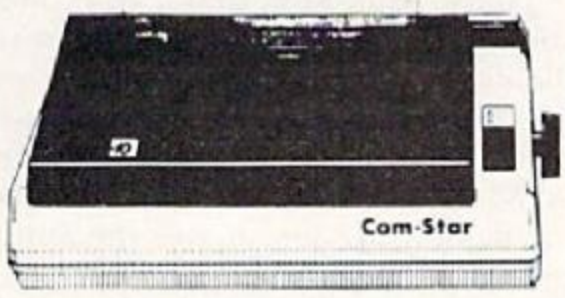

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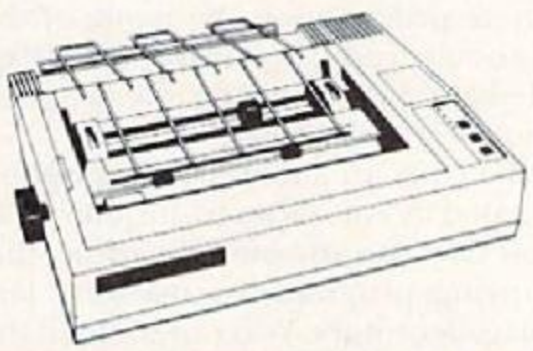

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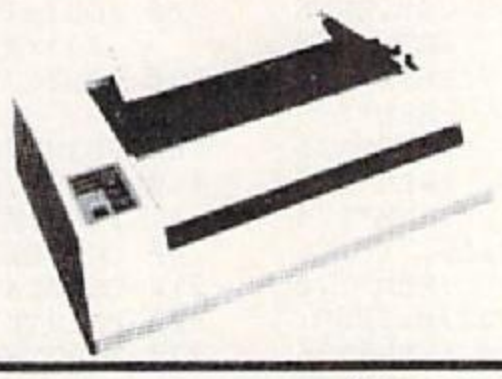

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then set to this start address minus 1.

Next, at line 140, the two characters CHR$(2) and CHR$(3) are written to the output file. These two bytes represent the start address assigned to the output file. The value is $0302, which is the location of the warm-start vector.

Then the characters CHR$(60) and CHR$(3) are written. These represent the value $033C, which will be loaded over the warm-start vector; $033C is the address of the start of the cassette buffer in which the auto-start code is present.

Lines 150 and 160 Poke the command to be issued to Basic by the auto-start code into the proper place in the cassette buffer. In this case, the Basic command is Run. Advanced programmers who wish to create auto-start machine language files might want to change "RUN" to a "SYSxxxxx" command, where xxxxx is the address of the machine language program.

Next, at line 170, the contents of memory from just above the warm-start vector up to just below the start of the input program are copied to the output file.

Finally, at line 190, the remaining portion of the input file is copied to the output file. The disk files are then closed and the program stops.

Typing the Program

Auto-Run is a fairly short program, so it should not be much trouble to type it in. However, you must watch out for the semicolons in the Print statements. Any auto-start program you create will not work if you leave out any of the semicolons.

As always, be careful with the Data statements. If you get an Error in Data message when you run the program, check to see that you have entered the Data statements correctly.

Using Auto-Run

To use Auto-Run, first load it into your machine and run it. Then, insert the disk that contains your program into the disk drive. Type in the name of your program. When you are asked for the output name, type in the name you want to give the auto-start copy of your program.

The screen will clear and the program will start working. The program takes a couple of minutes to create the output file—longer for long programs. When the program is done, you can test your new program file.

Type in

```
LOAD"progname",8,1
```

where progname is the name of the auto-start copy of your program. Immediately after loading, the program should start running.

To copy an auto-starting program created by Auto-Run to another disk, you may use any one of various file-copying programs or machine language monitors. You cannot load the program and save it in the normal manner.

If you cannot copy such a file, you can always copy your original program to the disk, run Auto-Run to produce an auto-starting copy, then delete the copy of the original file.

Be sure to remove any cartridges or expansion boards before you run Auto-Run if you expect the auto-start program to run in an environment without them. Or leave them in place if you expect the program to run with them.

If your intention in producing an auto-start program is to prevent your program from being examined, you must take the necessary steps to make your original program airtight. That is, there should be no way of getting out of the program without its consent, short of powering down the machine. Of course, no protection scheme is perfect, so there is always some way of examining any program.

Some simple measures you can take are to disable the run/stop and run/stop and restore keys and to use the New command in the program to delete the program from memory.

To disable the keys, simply type POKE808,234 (normal value is 237) on the C-64 or POKE808,100 (normal value is 112) on the VIC-20. Type these Pokes before you run Auto-Run, and they will carry over to the auto-starting program. A nice side-effect of using these Pokes is that the List function will also be disabled. R

Address all author correspondence to Alejandro A. Kapauan, 141-6 Airport Road, West Lafayette, IN 47906.

Listing 1. *Auto-Run program for the C-64 and VIC-20.*

```
1Ø PRINTCHR$(147)CHR$(18)"AUTO-RUN CONVERTE
   R"                                    :REM*138
2Ø S=Ø:FORI=828TO862:READV:POKEI,V:S=S+V:NE
   XTI:IFS=3677THEN4Ø                    :REM*228
3Ø PRINT"ERROR IN DATA":END              :REM*16
4Ø PRINT"INSERT PROGRAM DISK"            :REM*22Ø
5Ø INPUT"PROGRAM NAME";F1$               :REM*174
6Ø CLOSE4:CLOSE5:CLOSE15:OPEN15,8,15,"I":CL
   OSE15:OPEN15,8,15                     :REM*17Ø
7Ø OPEN4,8,4,"Ø:"+F1$+",P,R":GOSUB23Ø:IFER<
   >ØTHENCLOSE4:GOTO5Ø                   :REM*136
8Ø INPUT"OUTPUT NAME";F1$                :REM*2Ø
9Ø OPEN5,8,5,"Ø:"+F1$+",P,W":GOSUB23Ø:IFER<
   >ØTHENCLOSE5:GOTO8Ø                   :REM*172
1ØØ Z$=CHR$(Ø)                           :REM*96
11Ø POKE829,PEEK(77Ø):POKE834,PEEK(771):POK
   E857,PEEK(771)                        :REM*6Ø
12Ø PRINTCHR$(147)"WAIT"                 :REM*234
13Ø GET#4,A$:GET#4,B$:L=ASC(A$+Z$)+256*ASC(
   B$+Z$)-1                              :REM*22
14Ø PRINT#5,CHR$(2)CHR$(3)CHR$(6Ø)CHR$(3);
                                         :REM*38
15Ø C$="RUN"+CHR$(Ø)                     :REM*192
16Ø FORI=1TOLEN(C$):POKE858+I,ASC(MID$(C$,I
   ,1)):NEXTI                            :REM*2Ø
17Ø FORI=772TOL:PRINT#5,CHR$(PEEK(I));:NEXT
   I                                     :REM*82
18Ø PRINT"COPYING FILE"                  :REM*118
19Ø GET#4,A$:S=ST:PRINT#5,CHR$(ASC(A$+Z$));
   :IFS=ØTHEN19Ø                         :REM*164
2ØØ GOSUB23Ø                             :REM*2Ø2
21Ø CLOSE4:CLOSE5:CLOSE15                :REM*24Ø
22Ø PRINTE1$:PRINT"DONE":END             :REM*3Ø
23Ø INPUT#15,ER,E1$,T,S:IFER=ØTHENRETURN
                                         :REM*212
24Ø PRINTE1$;T;S:RETURN                  :REM*78
25Ø DATA169,131,141,2,3,169,196,141,3,3
                                         :REM*16Ø
26Ø DATA16Ø,Ø,185,91,3,153,Ø,2,24Ø,3
                                         :REM*175
27Ø DATA2ØØ,2Ø8,245,162,255,16Ø,1,76,134,19
   6                                     :REM*121
28Ø DATAØ,82,85,78,Ø                     :REM*55
```


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There might be a g-i-r-a-f-f-e in the maze, or there might be an o-n-i-o-n, depending on the category you've selected. Juggle the letters to spell a word and have fun.

By PENNY DeGROFF

In most computer word-scramble games, the computer scrambles a word and displays it on the screen. The player then types in the correct word.

This game, Word Jumbler (Listing 1), is a little different. First, you are presented with eight categories, each dealing with a different subject. With a joystick in port 2, you move a white cursor beside the category you want, then press the fire-button to begin the game.

The playfield, a 12-section maze, will appear on the screen. Some sections will contain a letter; one section will contain a star; the rest will be empty. The letters, when combined in the correct order, will spell a word that relates to the category chosen. (For instance, the "I'm Hungry" category contains the names of various foods.)

To display the letters, one at a time, in their proper order, use the joystick to move the star directly under each letter and press the fire-button. That letter will then appear at the top of the screen. Continue this until all letters are removed from the maze, displaying a word.

At the bottom of the screen is the score section. When the maze is cleared, the word being played is shown along with the score and any bonus points earned.

If you've spelled the word correctly, you will earn one point for each letter in the word. There is no time limit for clearing the maze. However, bonus points are awarded if you do this in less than 30 seconds; you gain one point for each of the remaining seconds. Since the star must go around the letters instead of over them, you can clear the screen more quickly by going through the empty sections whenever possible.

Play continues until five words have been unscrambled. The grand total and high score are then shown. The option of playing another game is also presented at this time.

Making Changes

Any or all of the categories or words within them may be changed. Lines 160–200 contain the eight categories currently used. There are 20 words in each category. They are contained in Data statements beginning at line 950. Since the maze contains 12 sections, no word can have more than 11 letters. Have fun! R

Address all author correspondence to Penny DeGroff, Rt. 2, Box 2605, Garfield, AR 72732.

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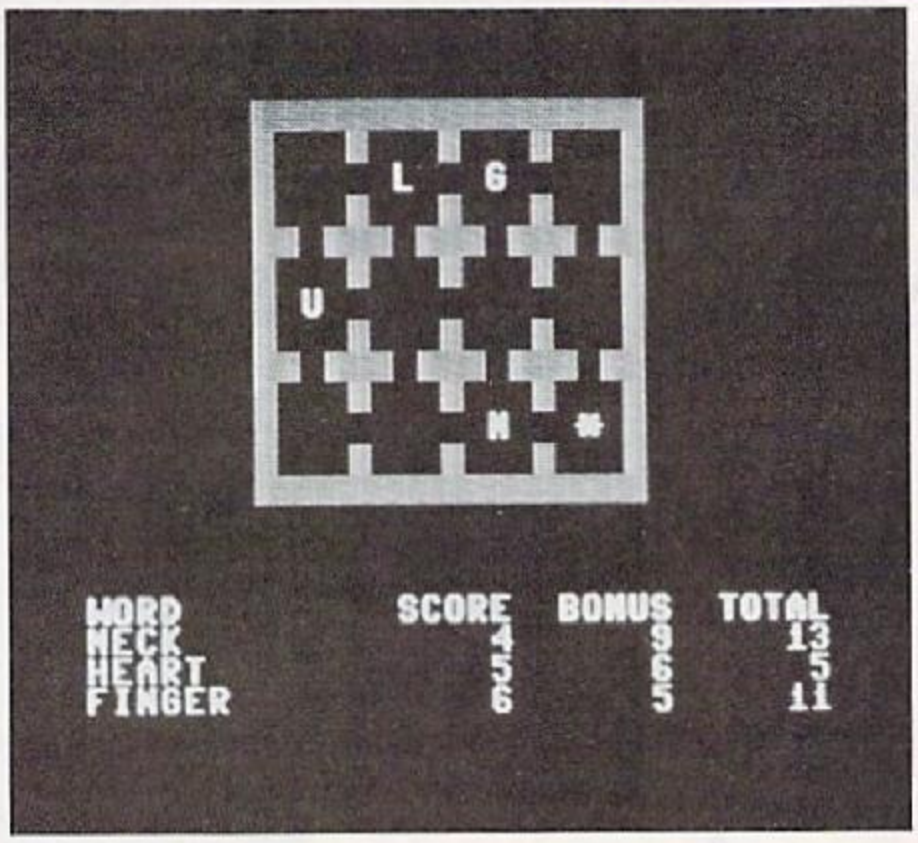

Listing 1. *Word Jumbler program.*

```
1Ø DIMD$(23),TS(5),W$(2Ø),L1(12),L2(12)
                                        :REM*146
2Ø D$(Ø)="{HOME}":FORX=1TO23:D$(X)=D$(X-1)+
   "{CRSR DN}":NEXT:C=54272:FORX=1TO16Ø:REA
   DW$:NEXT                             :REM*22Ø
3Ø FORX=1TO12:READL1(X):NEXT:PRINT"{SHFT CL
   R}":POKE5328Ø,Ø:POKE53281,Ø:POKE646,1
                                        :REM*232
4Ø PRINTD$(12)TAB(17)"WHATZIT":FORX=15TO1ST
   EP-1:POKE646,X                       :REM*1Ø4
5Ø PRINTD$(1Ø)TAB(15)"{CTRL 9}{11 SPACEs}":
   FORY=1TO3:PRINTTAB(15)"{CTRL 9} "TAB(25)
   " ":NEXT                             :REM*16
6Ø PRINTTAB(15)"{CTRL 9}{11 SPACEs}":PRINTD
   $(8)TAB(13)"{CTRL 9}{15 SPACEs}"     :REM*68
7Ø FORY=1TO7:PRINTTAB(13)"{CTRL 9} "TAB(27)
   " ":NEXT:PRINTTAB(13)"{CTRL 9}{15 SPACEs
   }"                                   :REM*122
8Ø PRINTD$(6)TAB(11)"{CTRL 9}{19 SPACEs}":F
   ORY=1TO11                            :REM*72
9Ø PRINTTAB(11)"{CTRL 9} "TAB(29)" ":NEXT:P
   RINTTAB(11)"{CTRL 9}{19 SPACEs}":REM*136
1ØØ PRINTD$(4)TAB(9)"{CTRL 9}{23 SPACEs}":F
   ORY=1TO15                            :REM*188
11Ø PRINTTAB(9)"{CTRL 9} "TAB(31)" ":NEXT:P
   RINTTAB(9)"{CTRL 9}{23 SPACEs}":NEXT
                                        :REM*68
12Ø FORX=CTOC+23:POKEX,Ø:NEXT:POKEC+24,15:P
   OKEC+5,1Ø:POKEC+6,1Ø                 :REM*122
13Ø READH:IFH=ØTHEN16Ø                  :REM*94
14Ø READL:POKEC,L:POKEC+1,H:POKEC+4,17:FORX
   =1TO1ØØ:NEXT:POKEC+4,16              :REM*14
15Ø FORX=1TO75:NEXT:GOTO13Ø             :REM*158
16Ø PRINT"{SHFT CLR}":POKE5328Ø,2:POKE53281
   ,3:POKE646,6:PRINTD$(2)TAB(6)"I'M HUNGR
   Y"                                   :REM*42
17Ø PRINTTAB(6)"{CRSR DN}MUSIC MAKERS":PRIN
   TTAB(6)"{CRSR DN}PEOPLE PARTS"       :REM*58
18Ø PRINTTAB(6)"{CRSR DN}PRETTY PETALS":PRI
   NTTAB(6)"{CRSR DN}HOME SWEET HOME"
                                        :REM*19Ø
19Ø PRINTTAB(6)"{CRSR DN}HOW'S THE WEATHER?
   ":PRINTTAB(6)"{CRSR DN}ALL WORK AND NO
   PLAY"                                :REM*132
2ØØ PRINTTAB(6)"{CRSR DN}TWO LEGS, FOUR LEG
   S, NO LEGS":POKE646,2                :REM*238
21Ø PRINTTAB(6)"{3 CRSR DNs}MOVE CURSOR WIT
   H JOYSTICK...."                      :REM*124
22Ø PRINTTAB(7)"{CRSR DN}PRESS FIRE BUTTON
   TO SELECT":OP=11Ø8:POKEOP,16Ø:POKEOP+C,
   1                                    :REM*32
23Ø FORX=1TO1ØØ:NEXT:IF(PEEK(5632Ø)AND16)=Ø
   THEN29Ø                              :REM*72
24Ø J=15-(PEEK(5632Ø)AND15):IFJ=1THENDI=-8Ø
   :GOTO27Ø                             :REM*198
25Ø IFJ=2THENDI=8Ø:GOTO27Ø              :REM*56
26Ø GOTO23Ø                             :REM*247
27Ø NP=OP+DI:IFNP<11Ø8ORNP>1668THEN23Ø
                                        :REM*23
28Ø POKENP+C,1:POKEOP,32:POKENP,16Ø:POKEOP+
   C,3:OP=NP:GOTO23Ø                    :REM*249
29Ø RESTORE:CA=(OP-1Ø28)/8Ø:ONCAGOSUB3ØØ,31
   Ø,32Ø,33Ø,34Ø,35Ø,36Ø,37Ø:GOTO38Ø
                                        :REM*89
3ØØ RETURN                              :REM*1Ø3
31Ø FORX=1TO2Ø:READW$:NEXT:RETURN        :REM*231
32Ø FORX=1TO4Ø:READW$:NEXT:RETURN        :REM*241
33Ø FORX=1TO6Ø:READW$:NEXT:RETURN        :REM*253
34Ø FORX=1TO8Ø:READW$:NEXT:RETURN         :REM*7
35Ø FORX=1TO1ØØ:READW$:NEXT:RETURN       :REM*17
36Ø FORX=1TO12Ø:READW$:NEXT:RETURN       :REM*29
37Ø FORX=1TO14Ø:READW$:NEXT:RETURN       :REM*41
38Ø FORX=1TO2Ø:READW$(X):NEXT           :REM*137
39Ø PRINT"{SHFT CLR}":POKE5328Ø,Ø:POKE53281
   ,Ø:POKE646,1                         :REM*249
4ØØ PRINTD$(18)TAB(4)"WORD"TAB(17)"SCORE"TA
   B(24)"BONUS"TAB(31)"TOTAL"           :REM*231
41Ø WC=Ø:TC=Ø:CU=18                     :REM*147
42Ø WC=WC+1:IFWC>5THEN8ØØ               :REM*2Ø3
43Ø TC=TC+2:POKE646,TC:PRINTD$(2)TAB(11)"{C
   TRL 9}{17 SPACEs}":FORX=1TO3         :REM*2Ø9
44Ø PRINTTAB(11)"{CTRL 9} {3 CRSR RTs} {3 C
   RSR RTs} {3 CRSR RTs} {3 CRSR RTs} ":PR
   INTTAB(11)"{CTRL 9} "TAB(27)" ":REM*179
45Ø PRINTTAB(11)"{CTRL 9} {3 CRSR RTs} {3 C
   RSR RTs} {3 CRSR RTs} {3 CRSR RTs} ":PR
   INTTAB(11)"{CTRL 9}{2 SPACEs}{CRSR RT}{
   3 SPACEs}{CRSR RT}{3 SPACEs}{CRSR RT}{3
   SPACEs}{CRSR RT}{2 SPACEs}":NEXT
                                        :REM*61
46Ø PRINTTAB(11)"{CRSR UP}{CTRL 9}{17 SPACE
   s}":POKE646,13                       :REM*89
47Ø FORX=1TO12:L2(X)=L1(X):NEXT:LP=Ø:WP$=""
                                        :REM*97
48Ø WN=INT(RND(1)*2Ø)+1:IFW$(WN)=""THEN48Ø
                                        :REM*253
49Ø LP=LP+1:IFLP>LEN(W$(WN))THEN52Ø:REM*177
5ØØ X=INT(RND(1)*12)+1:IFL2(X)=ØTHEN5ØØ
                                        :REM*191
51Ø POKEL2(X),ASC(MID$(W$(WN),LP,1))-64:POK
   EL2(X)+C,14:L2(X)=Ø:GOTO49Ø          :REM*53
52Ø X=INT(RND(1)*12)+1:IFL2(X)=ØTHEN52Ø
                                        :REM*228
53Ø OP=L2(X):POKEOP,42:POKEOP+C,7:TI$="ØØØØ
   ØØ"                                  :REM*246
54Ø FORX=1TO6Ø:NEXT:IF(PEEK(5632Ø)AND16)=ØT
   HEN62Ø                               :REM*23Ø
55Ø J=15-(PEEK(5632Ø)AND15):IFJ=1THENDI=-4Ø
   :GOTO6ØØ                             :REM*214
56Ø IFJ=2THENDI=4Ø:GOTO6ØØ              :REM*222
57Ø IFJ=4THENDI=-1:GOTO6ØØ               :REM*14
58Ø IFJ=8THENDI=1:GOTO6ØØ               :REM*2Ø6
59Ø GOTO54Ø                             :REM*1Ø6
6ØØ NP=OP+DI:IFPEEK(NP)<>32THEN54Ø       :REM*64
61Ø POKENP+C,7:POKEOP,32:POKENP,42:POKEOP+C
   ,Ø:OP=NP:GOTO54Ø                     :REM*64
62Ø IFPEEK(OP-4Ø)>26THEN54Ø             :REM*2Ø8
63Ø WP$=WP$+CHR$((PEEK(OP-4Ø))+64):PRINTD$(
   1)TAB(11)WP$:POKEOP-4Ø,32            :REM*248
64Ø POKEOP-4Ø+C,Ø:IFLEN(WP$)<>LEN(W$(WN))TH
   EN55Ø                                :REM*66
65Ø T=VAL(TI$):POKE646,1Ø:POKEOP,32:POKEOP+
   C,Ø:IFWP$=W$(WN)THEN68Ø              :REM*228
```

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Listing 1 continued.

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66Ø FORX=CTOC+24:POKEX,Ø:NEXT:FORX=1TO1Ø:PO
    KEC+24,15:FORQ=1TO3:NEXT          :REM*236
67Ø POKEC+24,Ø:FORQ=1TO3:NEXT:NEXT:GOTO69Ø
                                      :REM*226
68Ø POKEC+24,15:POKEC,1Ø:POKEC+1,1ØØ:POKEC+
    5,9:POKEC+6,9:POKEC+4,17:POKEC+4,16
                                      :REM*182
69Ø CU=CU+1:PRINTD$(CU)TAB(4)W$(WN);:SC=Ø:I
    FWP$=W$(WN)THENSC=LEN(WP$)        :REM*14
7ØØ PRINTTAB(19);:IFSC<1ØTHENPRINT" ";
                                      :REM*134
71Ø PRINTSC;TAB(26);:BO=Ø:IFT<3ØTHENBO=3Ø-T
                                      :REM*78
72Ø IFSC=ØTHENBO=Ø                    :REM*48
73Ø IFBO<1ØTHENPRINT" ";              :REM*218
74Ø PRINTBO;TAB(33);:TS(WC)=SC+BO:IFTS(WC)<
    1ØTHENPRINT" ";                   :REM*248
75Ø PRINTTS(WC):POKE646,15            :REM*62
76Ø PRINTD$(16)TAB(11)"PRESS FIRE BUTTON":F
    ORX=1TO5Ø:NEXT                    :REM*252
77Ø PRINTD$(16)TAB(11)"{17 SPACEs}":FORX=1T
    O3Ø:NEXT                          :REM*239
78Ø IF(PEEK(5632Ø)AND16)=16THEN76Ø    :REM*111
79Ø PRINTD$(1)TAB(11)"{12 SPACEs}":W$(WN)="
    ":GOTO42Ø                         :REM*191
8ØØ PRINTD$(23):FORX=1TO15:PRINT:NEXT:POKE6
    46,8                              :REM*249
81Ø PRINTD$(12)TAB(16)"GAME OVER":GT=Ø:FORX
    =1TO5:GT=GT+TS(X):NEXT            :REM*79
82Ø PRINTTAB(13)"{CRSR DN}GRAND TOTAL"GT:IF
    GT>HSTHENHS=GT                    :REM*49
83Ø POKE646,3:PRINTTAB(13)"{CRSR DN}HIGH SC
    ORE"HS:POKE646,12                 :REM*51
84Ø PRINTTAB(11)"{CRSR DN}PLAY AGAIN? YES/N
    O":OP=18Ø7:POKEOP,3Ø:POKEOP+C,3   :REM*51
85Ø POKE646,13:PRINTTAB(1Ø)"{2 CRSR DNs}MOV
    E ";:POKE646,3:PRINT"{UP ARROW}";:POKE6
    46,13                             :REM*79
86Ø PRINT" WITH JOYSTICK":PRINTTAB(7)"{CRSR
     DN}PRESS FIRE BUTTON TO SELECT":REM*65
87Ø IF(PEEK(5632Ø)AND16)=ØTHEN93Ø     :REM*13
88Ø J=15-(PEEK(5632Ø)AND15):IFJ=4THENDI=-4:
    GOTO91Ø                           :REM*191
89Ø IFJ=8THENDI=4:GOTO91Ø             :REM*179
9ØØ GOTO87Ø                           :REM*233
91Ø NP=OP+DI:IFNP<18Ø7ORNP>1811THEN87Ø
                                      :REM*87
92Ø POKENP+C,3:POKEOP,32:POKENP,3Ø:POKEOP+C
    ,Ø:OP=NP:GOTO87Ø                  :REM*89
93Ø IFOP=18Ø7THEN16Ø                  :REM*65
94Ø SYS64759                          :REM*239
95Ø DATAHAMBURGER,PIZZA,CABBAGE,CARROT,SPAG
    HETTI,STRAWBERRY,PINEAPPLE,RAISIN
                                      :REM*2Ø3
96Ø DATACHEESE,EGGPLANT,POTATO,BANANA,CUCUM
    BER,YOGURT,BOLOGNA,MARSHMALLOW,CHILI
                                      :REM*149
97Ø DATAONION,SQUASH,RHUBARB,GUITAR,BANJO,V
    IOLIN,DRUM,SAXOPHONE,TRUMPET      :REM*29
98Ø DATACLARINET,PIANO,ACCORDION,HARMONICA,
    HARP,MANDOLIN,FLUTE,XYLOPHONE,ORGAN
                                      :REM*115
99Ø DATACELLO,TUBA,TROMBONE,CYMBAL,TAMBOURI
    NE,SHOULDER,ANKLE,HEART,STOMACH   :REM*53
1ØØØ DATAKIDNEY,CORNEA,LIVER,SPLEEN,BRAIN,E
     LBOW,FINGER,TOOTH,AORTA,KNUCKLE:REM*87
1Ø1Ø DATAWRIST,LUNG,INTESTINE,FOOT,NECK,TON
     GUE,ORCHID,PETUNIA,ZINNIA,MARIGOLD
                                      :REM*65
1Ø2Ø DATAASTER,ROSE,PEONY,TULIP,CROCUS,AMAR
     YLLIS,HYACINTH,IRIS,PANSY,GLOXINIA
                                      :REM*183
1Ø3Ø DATABEGONIA,SNAPDRAGON,GERANIUM,DAISY,
     VIOLET,LILY,STEREO,CARPET        :REM*17Ø
1Ø4Ø DATASILVERWARE,TELEPHONE,TELEVISION,SH
     ELF,TOASTER,CURTAIN,CLOCK,CABINET
                                      :REM*88
1Ø5Ø DATACHAIR,STOVE,BLANKET,PILLOW,TABLE,L
     AMP,CALENDAR,CLOTHING,THERMOSTAT
                                      :REM*26
1Ø6Ø DATABROOM,TORNADO,LIGHTNING,THUNDER,SN
     OW,SLEET,RAINBOW,HURRICANE,HUMIDITY
                                      :REM*18
1Ø7Ø DATATEMPERATURE,BAROMETER,FORECAST,CLO
     UD,FLOOD,HAIL,FRONT,DROUGHT,BLIZZARD
                                      :REM*22Ø
1Ø8Ø DATAWIND,WARNING,FROST,ATTORNEY,SURGEO
     N,BANKER,ARTIST,WRITER,CARPENTER
                                      :REM*188
1Ø9Ø DATAENGINEER,REPORTER,ARCHITECT,LIBRAR
     IAN,NURSE,CHEF,POLITICIAN,TEACHER
                                      :REM*246
11ØØ DATAPLUMBER,JANITOR,FARMER,CLERK,ATHLE
     TE,ELECTRICIAN,TURTLE,COUGAR     :REM*5Ø
111Ø DATARATTLESNAKE,SALMON,OSTRICH,PEACOCK
     ,ZEBRA,SKUNK,BUFFALO,KANGAROO,LIZARD
                                      :REM*6Ø
112Ø DATAHUMMINGBIRD,CHIMPANZEE,ANTELOPE,SH
     EEP,DOLPHIN,SQUIRREL,RACCOON,GOPHER
                                      :REM*248
113Ø DATAWOODPECKER,1197,12Ø1,12Ø5,12Ø9,135
     7,1361,1365,1369,1517,1521,1525,1529
                                      :REM*172
114Ø DATA22,96,44,193,89,131,25,3Ø,5Ø,6Ø,1Ø
     Ø,121,28,49,56,99,112,199,Ø,Ø    :REM*78
```


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From p. 28.

pencil. Speed of execution may be varied for effect, and the program allows easy combination of text and graphics.

The Print Shop

Because The Print Shop is geared for output to your printer, many of its graphics designs are never seen on the screen and therefore cannot be output to a VCR.

However, there is a kaleidoscope feature that displays an ever-changing geometric pattern, over which you can superimpose print in two different sizes. I rather like the way the print seems to form itself out of nothing, somewhat like the titles Hollywood used for horror movies.

For speedier execution, you may also use text without the kaleidoscope background. The Print Shop also contains eight different fonts, so you may match the type to the situation.

However, The Print Shop is not a color program, so make the best of black-and-white titles. (Broderbund Software, 17 Paul Drive, San Rafael, CA 94903.)

Graphics Basic

Graphics Basic, by HesWare (390 Swift Ave. #14, South San Francisco, CA 94080), is, without exception, the best extended Basic program ever.

Programming is called for here, but extended Basic is logical and easy. Even I can use it.

Because you are working from a program, taping the execution as the program runs is a good way to achieve animation.

The Fill command, for example, sends color running across your screen to paint an enclosed space. The Line command (from;to) draws a line so quickly you can use it to represent a laser beam.

GPRINT allows precise positioning of text, in a variety of sizes and in one of four built-in fonts. On execution, the letters form across your screen from left to right.

An easy sprite editor and simple sprite commands complete the package. Using sprites, I've created such varied scenes as exploding fireworks and people running to fill theatre seats.

Final Tips

Those are my favorites. In finding your own, I'd suggest the following guidelines:

1. Use software that permits a variety of type sizes. Standard-size type can be difficult to read from the average TV viewing distance.
2. Use something that gives you a variety of fonts. A large selection allows you to match the type to the mood you wish to convey.
3. Unless you're a whiz at programming sound, forget your VCR's audio connection. Use it later to dub in appropriate music from your record or tape collection.

Once you've done all this, you're ready to amaze your family and friends. Or do as I do—give a videotape client something uniquely your own, and use the extra dollars to support your computer habit. R

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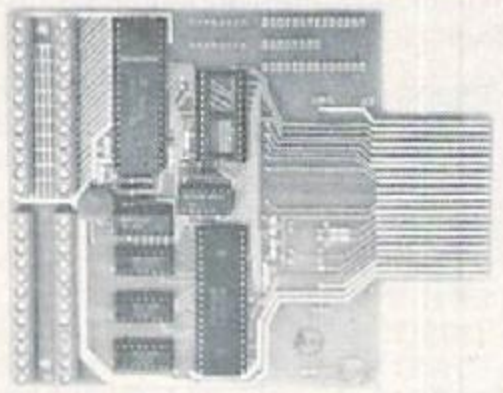

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From p. 10.

The format is

MID$(string1,position<,length>) = string2

What happens is the first length characters of string2 replace the length characters of string1, starting at the variable "position." The remainder of string1 is not affected.

The length is an option, but if you leave it out, string2 cannot be longer than the remaining number of characters in string1, or an illegal quantity error results.

Rick Rothstein
Trenton, NJ

$298 CP/M utilities—If you are using CP/M mode on the C-128, you might think that it came without some of its important utilities, because they don't show up in any disk directory. Flip your disk to the other side, and you'll find them lurking there.

Eugene Cozzi
Barre, VT

$299 C-64/VIC Buffer Saver—Many interesting programs Poke machine language routines into the cassette buffer and adjoining locations, which occupy memory from 820 to 1023, decimal. The trouble with this technique is that you must run the Basic Poker every time you want to load your machine language routines.

The routine below saves the machine language directly from the buffer to disk or tape. To use Buffer Saver, just add it to the end of your Basic Poker program and add the proper program name in line 160. If you have a VIC, you must also change the SYS64738 to SYS64802. As printed, the program saves to disk. To make it save to tape, change the ,8 after the SAVE to a ,1,1.

Once machine language programs have been saved to disk, they must be loaded using the format

LOAD"name",8,1

in order to work properly, and a New command must be executed following the load. If the New wipes out an important Basic program, you can either reload it or use an Unnew program to bring it back to life. If you use the DOS 5.1 wedge, you can load machine language by using % instead of /, and, in that case, you need not perform the New command.

```
10 PRINT "{SHFT CLR}{CRSR DN} 64/VIC BUFFE
   R SAVER - LOUIS F. SANDER{CRSR DN}"
11 PRINT"SAVES 820-1023 ($0334-$03FF) TAPE
    BUFFER"
12 PRINT"{CRSR DN}NOTICE - YOU MUST FIRST
   PUT YOUR"
13 PRINT"PROGRAM NAME INTO LINE 160."
14 INPUT"{CRSR DN}READY TO SAVE THE BUFFER
   ";A$:IFLEFT$(A$,1)<>"Y"THENEND
15 POKE43,52:POKE44,3:POKE45,0:POKE46,4:PO
   KE179,20:CLR
16 SAVE"PROGRAM NAME",8:SYS64738:REM CHANG
   E TO SYS64802 FOR VIC
```

Louis F. Sander
Pittsburgh, PA

$29A Working with machine language—You can easily tell when a Basic program includes a machine language routine, because you'll see one or more Data statements whose elements are numbers between 0 and 255. Those numbers are the machine language program, and the Basic program always includes some Pokes to put them into memory.

Once the machine language program is in memory, it is activated by a SYS command, which is the machine language equivalent of RUN. Sometimes the SYS causes a one-time action to take place, and sometimes it activates a feature that you can access again and again, until the computer is reset.

Even if you erase your Basic program with the New command, or even if you reset it with stop/restore or a reset button, the machine language program remains in memory! If your reset seems to have killed the machine language, you can usually resurrect it by repeating the original SYS.

Ilse Payne
Cheswick, PA

$29B Delete a block of lines—If you have a C-64 or VIC, it's never pleasant when a large block of Basic lines needs to be removed from your program. To delete them, you must type each line number individually, then press the return key. Sometimes, you can write a Basic program to automate the task, but such programs usually depend on your lines being numbered in a very regular way.

If you have a C-128, Plus/4 or C-16, or if you own a programmer's aid cartridge, the Delete command is a godsend at times like these—it lets you remove any number of lines, just by typing one command.

The accompanying program provides the Delete command for the rest of us. When run, it puts a machine language program into the cassette buffer. Once that program is in place, blocks of lines can be deleted by typing commands of the following form:

SYS828,starting line#,ending line# + 1 <return>

For example,

SYS828,100,200 deletes lines 100–199
SYS828,0,100 deletes everything up to line 99
SYS828,300,63999 deletes everything from line 300–63998
SYS828,300,0 deletes everything from 300 up

Once the machine language is in place, you can use this month's Buffer Saver program to save it directly, so you won't have to bother with the Basic program again. Machine language experts will be pleased to know that the machine language is completely relocatable, making it possible to store in any safe area of memory.

```
10 PRINT"BLOCK DELETE - J. PELLECHI"
20 CS=0:FORJ=1TO147:READK:CS=CS+K:NEXT
30 RESTORE:IFCS<>17763THENPRINT"DATA ERROR"
   :STOP
```

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Listing continued.

```
40 S=828:FORJ=STOS+146:READK:POKEJ,K:NEXT:I
   FPEEK(65532)=226THENEND:REM C-64
50 POKES+6,206:POKES+26,198:POKES+37,198:PO
   KES+56,198:REM VIC-20
60 POKES+140,197:POKES+143,19:POKES+146,196
   :REM VIC-20
61 DATA 162,004,138,072,032,253,174,032
62 DATA 107,169,104,170,165,021,149,105
63 DATA 165,020,202,149,105,202,208,234
64 DATA 032,089,166,165,108,166,109,133
65 DATA 020,134,021,032,019,166,165,095
66 DATA 166,096,133,108,134,109,165,106
67 DATA 166,107,133,020,134,021,032,019
68 DATA 166,165,095,166,096,133,106,134
69 DATA 107,165,108,197,106,165,109,229
70 DATA 107,144,012,165,045,233,002,133
71 DATA 106,165,046,233,000,133,107,056
72 DATA 165,045,229,106,133,104,165,046
73 DATA 229,107,133,105,024,165,104,101
74 DATA 108,133,045,165,105,101,109,133
75 DATA 046,160,000,165,104,208,004,198
76 DATA 105,048,015,198,104,177,106,145
77 DATA 108,200,208,239,230,107,230,109
78 DATA 208,233,032,051,165,032,089,166
79 DATA 076,128,164
```

James Pellechi
Middle Island, NY

$29C Restore key tip—If you've experienced erratic operation when using the stop/restore combination, you've got plenty of company. Don't call the repairman, though, because there's nothing wrong with your computer. To work properly, the circuitry that monitors the restore key must see a sharp and rapid change in that key's status. So, if restore is pressed gently—in the manner of the other keys—the monitoring circuit often misses the event. The solution is to always use the following keyboard technique:

Press the stop key and hold it, just as though you were using it to shift a letter key. While stop is firmly depressed, give the restore key one sharp tap, as though your finger were a woodpecker's beak.

Mary Haver
Wood Islands, PEI
Canada

$29D Easy-fingered loading—It's common practice to rename frequently used programs with one-character names, to minimize the amount of typing necessary to load them. It's even better when the new name is a single *shifted* character, such as shifted W. With such names, you can press the shift key immediately after the L in the abbreviated Load command, and not release it until the comma before the 8 for the disk drive number. This eliminates the coordinated fingering required with other sorts of filenames. It's not much, but it sure feels better!

David A. Hooyer
Bangkok, Thailand

$29E Detecting keypresses—There is an alternative to the Get statement in detecting single keypresses on Commodore computers. A memory location called LSTX always contains a number that corresponds to whatever key is currently pressed. Here are the locations of LSTX:

C-64 and VIC—197
Plus/4 and C-16—2038
C-128—213

You can determine the values for different keys by executing the following program and pressing the keys. Substitute one of the numbers above for LSTX in the following example.

```
10 PRINT PEEK (LSTX) : GOTO 10
```

Feng Yihao
Singapore

$29F Exclusive OR operator—The exclusive OR, also called XOR or EOR, works by comparing the bit patterns of two numbers and then returning a 1 for every case where the bits are dissimilar. In other words, if the compared bits are both 0s or both 1s, a zero will be returned.

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But if one is 1 and the other is 0, the XOR will return a 1. The principle is illustrated by this diagram:

```
      1001
XOR   1100
      ----
      0101
```

Machine language includes an XOR operator, and it is frequently used for flipping bits. (Using XOR to combine one byte with a byte consisting of all 1s gives a new byte whose bits are the reverse of those in the original.)

Commodore Basic doesn't have an XOR operator, but you can easily simulate one by using this:

```
A XOR B = (A OR B) AND NOT (A AND B)
```

Georges Elias
Tripoli, Lebanon

$2A0 Cardco modification—I have a Cardco/? + G interface. I use it mainly for printing text, but occasionally I use it with The Print Shop program. Changing between the two applications normally requires opening the interface and flipping DIP switch #8.

I made the job much easier by turning the DIP switch off and wiring a Radio Shack #275-624 toggle switch in parallel with its terminals. I mounted the switch in a hole in the interface's cover. Now, when I need to change applications, all I do is flip the Radio Shack switch.

Jim Lynch
St. Thomas, Virgin Islands

$2A1 Screen scrolling—Here are some easy ways to scroll your screen up or down a line, without using any machine language routines. Upward scrolling can be done by:

```
PRINT " [HOME] [25 CRSR DNs] [HOME] "
```

Downward scrolling, on the C-64 only, can be accomplished by:

```
PRINT " [HOME] [CRSR DN] [CRSR LF] [SHFT INST] " : POKE 218,156
```

Shachar Ebel
Rehovot, Israel

$2A2 Faster-running programs—Here are some hints to make your Basic programs run faster:

- In For...Next loops, type the Next without the variable name.
- If possible, do not use arrays.
- If you have numerous Data statements, put them at the beginning of your program.
- Do the same with frequently executed subroutines.
- Strip all the spaces and REMs from your program.

Javier Echeverria
Santander, Spain

$2A3 Gemini 10X paper sensor—You can disable this sensor by executing the following command:

```
OPEN 4,4 : PRINT#4,CHR$(27);"8" : CLOSE 4
```

Moien Jawaid Zobairi
Riyadh, Saudi Arabia

$2A4 SFD 1001 disks—The Commodore SFD-1001 disk drive looks just like a 1541, but it holds one megabyte of information. The major difference between the SFD-1001 and the 1541 is that the SFD-1001 is a direct drive with a massive heat sink and an IEEE interface instead of a serial bus. The SFD-1001 is made, but not sold, by Commodore; it is only available at a few places. Working with this drive can be a pleasure, but it has more than its share of challenges, mostly due to poor documentation.

Commodore recommends a 96TPI disk for use in this drive, but such disks are extremely hard to find and require a very strong signal to format and write to; the SFD-1001's signal is not strong enough. I've had success with premium-quality DSDD disks, such as Dysan and Maxell.

John Saguto
Washington, DC

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The Resource Center

By MARGARET MORABITO

RUN's technical manager Margaret Morabito has extensive experience in the educational field, having taught college and high school English and writing, as well as Basic programming. She has also been involved in curriculum development and has written educational software for use on the C-64.

Although millions of people use their C-64s at home, credit is not often given to Commodore computers as being tools for serious applications. If you ask anyone who doesn't own a Commodore to describe one, you will invariably get the reply, "Oh, that's the inexpensive game computer."

A Gap in Our Education

One area that has been covered only vaguely in computer magazines is that of serious educational applications. Most coverage of education in Commodore-specific magazines has been limited to spot reviews of unrelated educational software and program listings of math and word games. Furthermore, if you read educational journals, you will find scant coverage of Commodore computers. (Commodore Business Machines is helping to overcome this to a limited extent by placing C-128 advertisements in major educational journals.)

Many educators are looking specifically for information on how to use computers (any computers) in their school systems, from administrative work to classroom teaching to home reinforcement. Community leaders and school board members are constantly being bombarded with the request to get computers into the schools, but they don't have anywhere to turn for advice on what equipment to buy, what software works best, or even how to implement computer usage throughout the various disciplines within the school.

One of the best-kept secrets in the U.S. is that Commodore computers are ideal for educational applications. So, let's start spreading the word. Through this column, we'll share ideas, methods, success or failure stories and suggestions on how to make the most of your Commodore inside and outside the classroom.

People in these positions would be well advised to take a look at the ability of Commodore computers to meet their needs. Unfortunately, there has been no concerted effort to let these people know that the Commodore computer is an excellent choice for educators, and that its capabilities reach far beyond that of just home entertainment. There also has been no effort to teach Commodore owners how to use their equipment and software for practical and directed educational applications, at home or in school.

Those of you who own a C-64 or C-128 already realize the power, versatility and cost-effectiveness of your computer system. Commodore computers are the predominant choice for the home because of these factors. What is amazing is that in the U.S., where C-64s and VIC-20s have been top sellers for four years, Commodore computers are not more prevalent at all levels of education.

If you own a Commodore, then you know that this computer surpasses others in the areas schools need to consider: the price of hardware and software, the availability of both, the versatility of the system and the presence of Commodores in the homes of many students. What you may not know is exactly how the computer can be a useful and productive tool in the educational process.

An Education Column

This month, *RUN* is beginning ongoing coverage of Commodore computers for educational purposes, with the hope of helping to fill this void for all concerned.

In this column, a serious effort will be made to let parents, teachers, administrators and students know exactly how Commodore computers are being used throughout the U.S. and Canada for teaching, learning and administrative projects. The goal is to share information among all interested groups and to help home users and professional educators apply educational teaching and learning concepts through the medium of the computer, particularly Commodore computers. This information will come from those of you who are already using your Commodores for educational purposes; actual case studies will be presented from the information gathered.

All age groups of learners will be addressed, from pre-schoolers through college level, including adults in con-

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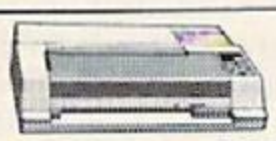

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tinuing education coursework. Furthermore, all disciplines will be covered. Personal computers are obviously used for teaching computer programming, but there are a myriad of other non-computer subjects, such as writing, history, geometry, foreign language study, art, design and music—to name just a few—that can be enhanced with the use of a computer.

Specific peripherals and related hardware combinations will be addressed. Types of software (such as drill and practice, simulations, gradebook managers, etc.) will be mentioned, as well as specific software products that have been tested in real learning and teaching settings. Recommendations from those of you who are using particular hardware, peripherals and software combinations will be shared in this column. Also, whenever possible, summaries of recommended teaching plans will be included.

We would also like to share your experiences in acquiring your equipment. How does a school system with limited money get a computer program started?

Have you been able to measure an improvement in academic performance that has resulted from the use of the computer in your home or school? A big question on educators' minds is whether the computer is actually a boon to the teaching and learning process.

If you have been able to measure a change in a child's learning ability that was a direct result of his or her interaction with computers, please let us know. It would be useful to be able to share information that reveals computers as being a positive force and to specify in what areas they are most effective.

Is your school office using computers to keep track of administrative chores? All aspects of the educational realm will be covered in The Resource Center. The end goal is to provide many hints and tips on the combinations of equipment, software, subject matter and lesson plans that work most effectively. When a particular combination doesn't work, we would like to mention that, too.

A Call for Help

If you are using a Commodore VIC-20, C-64, Plus/4, C-16 or C-128 at home or in a school—college, continuing education, high school, elementary or preschool—send me a letter outlining the equipment you are using, the subject area or areas in which you are teaching or learning, and any other details that you would like to share with our readers. Let me know of your successes and the problems that you have encountered. (Canadians have been in the forefront of using Commodore computers for education, so I am especially interested in letters from those readers.)

I will contact you individually for further details, and if your situation is chosen for this column, I will include your information and (if you don't mind) your name and address, so that others can ask you questions.

Next month, we will take a look at how one school system is using multiuser networking to link together a classroom of C-64s and VIC-20s and how that school initially got started with computers. R

Address all author correspondence to Margaret Morabito, c/o The Resource Center, RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

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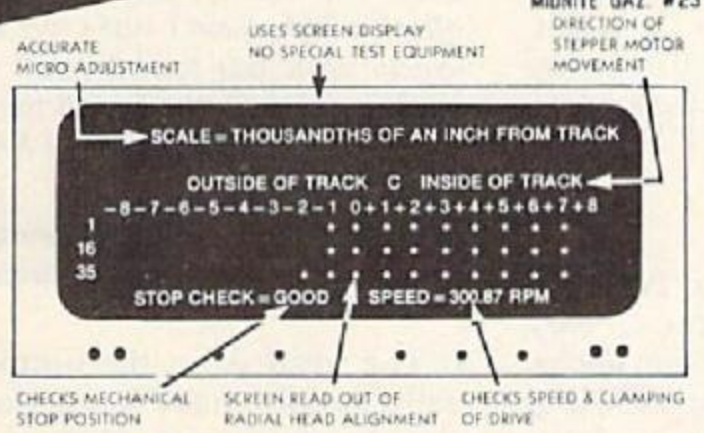
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COMMODORE CLINIC

By JIM STRASMA

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Queries are answered only through this column, and, due to the volume of mail, only questions that appeal to the majority of our readers can be published.

UPDATES

Update: I'd like to add to your answer to Warren Furman (p. 108, October 1985) about Passport's MIDI interface. Before trying MIDI programming, read (two or three times!) the "MIDI 1.0 Specification." You will also want the Yamaha data for your instrument, and you should be familiar with assembly language, as Basic is probably too slow for serious MIDI hacking.

MIDI is an optically isolated, 5mA current, loop serial interface, running at 31.25K, with one start bit, eight data bits and one stop bit. Data is available from: The International MIDI Association, 11857 Hartsook St., North Hollywood, CA 91607; 818-505-8964.

John Strohm
Ft. Worth, TX

A: Thanks for the added information. Thanks to MIDI's speed, hackers are also beginning to investigate it as a way to implement a low-cost network.

Update: In your answer to Keith Marshall about 16-bit microprocessors for Commodore machines (p. 100, October 1985), you avoided the issue of chips that have a 16-bit internal design and do a dual 8-bit fetch. The 65802 is a 65xx-compatible chip that does this and accepts all 6502, 65C02 and 65816 codes. You can plug a 65802 into any Commodore that uses a 6502 processor. The approach certainly worked for IBM on their PC. Care to comment?

Dave English
Orange, CA

A: Pseudo 16-bit machines like the IBM PC and Commodore's own 6809-based SuperPET are only slightly faster than 8-bit competitors. A 16-bit internal design usually allows more memory and streamlines some operations, but an eight-bit data bus limits overall speed. As a result, pseudo 16-bit machines are being rapidly replaced by true 16-bit computers, such as IBM's PC-AT and Commodore's Amiga.

Update: In your October 1985 column, Clara Nash asked for an easy way to alphabetize names from books. I do a great deal of name indexing for genealogical societies, and my son and I wrote a program to do this. I am enclosing a copy and would be glad to send one, free of charge, to Clare Nash.

We've been selling the program through a genealogical magazine, but we're going to quit running the ad, as it's too much bother. The only reason we advertised was because so many genealogists couldn't find a name-indexing program.

Wilfred Bow
489 Old Orchard Drive
Essexville, MI 48732

A: Mr. Bow's program, written in compiled Basic, accepts up to 400 names per file, sorts them in memory and prints the results.

If you are dropping it commercially, Mr. Bow, how about releasing your index program as "freeware," allowing people to copy it freely and send you a donation if they keep and use it? That minimizes your costs and keeps the program available.

REPAIRS

Q: Is the read/write head on the SX-64's disk drive on the top or bottom? I read an article that claimed the head is on the bottom (which doesn't make any sense). I need to know this to make sure I put a cleaning disk in properly. (All the articles I read recommend cleaning the head on a regular basis.)

Seymour Gerr
South Windsor, CT

A: The head is on the bottom. Actually, it does make sense; dust and other contaminants are more likely to settle on the top surface (even so, a few other disk drives put the head on top).

As for cleaning the head on a regular basis, I recommend cleaning it no more than once a year. The oft-suggested weekly cleaning with a chemical cleaner causes more problems than it cures.

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Commodore Clinic

Q: *I have a C-128, an MSD dual disk drive and an MSD IEEE-488 interface, which I cannot get to run in C-128 mode. The turn-on SYS causes it to go dead. Do you have any answers?*

Gordon LaFlash
Toledo, OH

A: The MSD interface, like most other IEEE-488 interfaces developed for the 64, incorporates machine language code that would need to be rewritten to work in C-128 mode. Since an MSD drive with an IEEE cable is still slower than a 1571 or 1572 disk, there isn't much point in updating your interface. Instead, I plug my MSD into the C-128 via the serial bus.

Q: *After about two minutes of use, my C-64 resets itself and the rest of my system. It's not overheating, as everything is cool. I'd like to know what's wrong.*

Ian Stewart
Redlands, CA

A: Even though your system still feels cool, two minutes is enough warm-up time for a heat-related problem to show up. It isn't that the whole system is unacceptably hot; rather, one electronic part has become unusually sensitive to heat.

For example, your symptoms could be caused by a failing capacitor in the reset circuit, one that is all right when cold, but shorts out at normal working temperatures. Apart from making sure the problem is in the 64 itself (by unplugging all accessories and trying someone else's monitor and power supply), diagnosis and repair of this type of problem is best left to your dealer.

Q: *The drive in my SX-64 squeaks and is much noisier than a 1541. Is this a sign of trouble? Also, my demo disk leads me to believe the drive can store 340K. Can you confirm or refute this?*

J. Gough
Fallbrook, CA

A: The drive in the SX-64 shouldn't be any noisier than the 1541. To isolate the problem could be difficult, though, as removing the cover from an SX and gaining full access to the cramped drive assembly can take an hour, even when you've done it before. This is another job best left to your dealer.

As for storage capacity, the SX-64 drive is identical to the 1541. The only way to get 340K of data on either one is by cutting a second write-protect notch into a disk and turning it over to use the back side as though it were another disk. If you really need 340K, consider adding another external drive to your system. Commodore's SFD-1001, for example, holds over 1M (1000K) of data.

HARDWARE

Q: *I have a Commodore SFD-1001 one-megabyte disk drive and have found it to be of fabulous help. However, I have not been able to find out about its operating system, in regard to how many files can be in the directory, and how it handles relative and user files.*

Eric Martin
Decatur, IL

A: It uses DOS 2.7, the same as Commodore's 8250 and upgraded 8050 disks. Each disk can hold 244 files and handles relative and user files exactly as they would be handled on the 1541 and other recent Commodore drives.

However, it has more internal buffer memory than the 1541, allowing it to handle more open files at once, and a single relative file may expand as much as needed, spanning both surfaces of the disk if necessary. Also, the 1001's internal memory map is similar to those of the 8050 and 8250 rather than that of the 1541, so most programs for the 64 that directly address internal disk memory will need to be changed for the 1001.

Q: *Is there any way the disk drive could ignore the write-protect tab on a disk (maybe by putting in a switch)?*

Adam Kaplan
Sunrise, FL

A: Yes, a switch is the way to do it. Get a single-pole, double-throw, center-off switch, and then find the two wires going to the write-protect switch inside your disk drive. They are on the left side, near the front.

Cut one of the wires going to the original switch, and connect the end that goes to the main circuit to the middle pole of your new switch. Connect the other end, from the original switch, to one of the outer poles on your new switch. Then splice one end of a new wire into the other (uncut) wire of the original switch, and fasten its other end to the remaining pole on the new switch.

This gives you three possibilities at the flip of a switch: normal operation of the original write-protect switch, write-through (to rewrite disks whose write-protect notch is missing or covered) and read-only (to prevent changes to a disk even when its write-protect notch is uncovered).

Q: *I have a Toshiba TV Model CZ2094 and a C-128. Toshiba offers an RGB cable, type CPA 0908, which I understand works with the IBM PC. Will the same cable work with the C-128?*

Edward Epstein
Miami, FL

A: Yes, it should plug right in. I use the same cable for both my C-128 and my PC-compatible Corona. Commodore intentionally made the 128 plug-compatible with IBM color monitors.

Q: *I own a 64, Gemini 10-X printer and MW-302 interface. I have no problem with text output, but graphics output is nearly unusable. Can you help with DIP switch settings?*

Keith Wade
Yellville, AR

A: The problem is that your MW-302 interface was not designed to handle graphics output. The graphics model from the same company is the MW-350, which should work well with your Gemini printer. The MW-302 will work well for someone with a daisywheel or other non-graphics printer.

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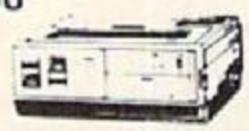

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RCommodore Clinic

SOFTWARE

Q: I recently reread your review of terminal programs for the C-64 in RUN*'s September 1984 issue. One of the programs you reviewed was Midwest Micro's Superterm, which can emulate a DEC VT-100. I have written Midwest Micro at two addresses, but both letters were returned with no forwarding address. Can you supply a current address or a copy of the manual?*

Stan Szyryj
903 N. Damen Ave.
Chicago, IL 60622

A: Jim Rothwell, Midwest Micro's president, was at a trade show I attended last summer. At that time, he told me that the company is out of business and that their products were no longer available. I've included your full address in case another reader has a copy he or she no longer uses and is willing to sell to you.

PROGRAMMING

Q: I have written a useful program, but I have a problem with it. When I use the program, the computer freezes up for 10–40 seconds, and then continues as if nothing had happened. I am confused as to why my computer is doing this.

Stephen Ritchey
New Carlisle, PA

A: The cause is "garbage collection," a procedure performed automatically and unpredictably by Basic itself. Its purpose is to reclaim memory space formerly used by dynamic strings your program no longer needs.

The culprits are strings stored in high memory, between the top of Basic's work space and the end of your Basic program lines. Two statements that put strings in this area are:

```
100 INPUT A$
110 A$ = "X" + "Y"
```

A common alternative statement is:

```
120 A$ = "XY"
```

VIC and 64 owners can minimize garbage collection delays by replacing lines like 100 and 110 with lines like 120 whenever possible. Garbage collection delays have been nearly eliminated on other current Commodore models.

Q: I am writing a program and need it to start over, but it doesn't reread the data. Is there a way to reset all variables, strings, etc.? Also, can I reset the DIM statements so I won't get a Redimensioned Array error?

James Soldi
El Centro, CA

A: Basic provides at least two ways to do what you ask. One way is by using the Run command. We type it all the time, but many people don't realize you can include it within a program itself. You can even follow it with a line number from which you wish the program to begin running again.

Also, the CLR statement resets all the variables, including arrays. Most new programmers think the CLR key only erases the screen. However, Basic also provides a CLR statement that has nothing to do with the screen. It is called automatically by the Run command, but can also be used manually. Its purpose is to clear all variable pointers, including array pointers.

Q: Have any of your readers developed an easy way to skip lines between pages?

George Lovelace
Lakeland, FL

A: Many printers recognize CHR$(12) as a command to skip immediately to the top of the next page. To use this feature, simply insert CHR$(12) whenever you want to begin a new page.

Some Commodore printers require that you send a CHR$(147) at the beginning of your printout to tell the printer it is at the top of a page and that it should automatically skip over the paper's perforations. You may then send a CHR$(19) to eject the current page and turn off the automatic skip at the bottom of each page. You can even combine the two, send a CHR$(147) immediately after CHR$(19), to immediately turn paging back on for the next page.

Q: I have written a Basic program that takes up most of my 64's memory. It gives me an Out of Memory error when run. Is there a way to obtain more memory to run my program?

Robby Guttman
West Nyack, NY

A: Yes, there are several ways to fight Out of Memory errors. One way is to split your one large program into two or more smaller ones, and use the chain feature of the Load command to run them one after the other.

Another technique is to shorten your Basic program by deleting REM statements and spaces and use colons to combine Basic lines.

A third technique is to rewrite part of your program in machine language placed in the memory above or behind Basic itself. At least one company is also advertising a program that modifies Basic itself to make memory above address $A000 available to Basic programs.

Q: The Commodore 64 Programmer's Reference Guide *has a table of status values for the reserved variable ST. It is incomplete, as I once had an ST value of 66 when trying to read a disk file. What other status numbers are there?*

Henry Elwell
Cleveland, NC

A: ST is actually a binary value, even though we read it in decimal. That means it can simultaneously show several different errors, each contributing part of the value of the error status number displayed by ST. To decode such ST values as 66 without learning more about binary, simply subtract from your ST value the largest number in the ST table that is less than or equal to your value. Your value includes the error listed next to that value. If there is a remainder, repeat the process on it until you have identified all errors.

In the example you cited, an ST value of 66 indicates 64, "End of File," with a remainder of 2, which in turn indicates "Time Out on Input." This combination could result from trying to read past the end of your file. R

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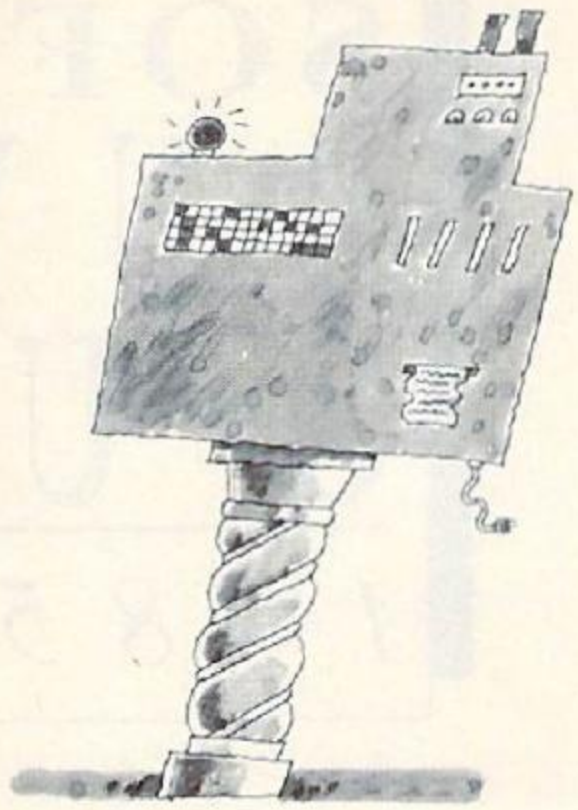
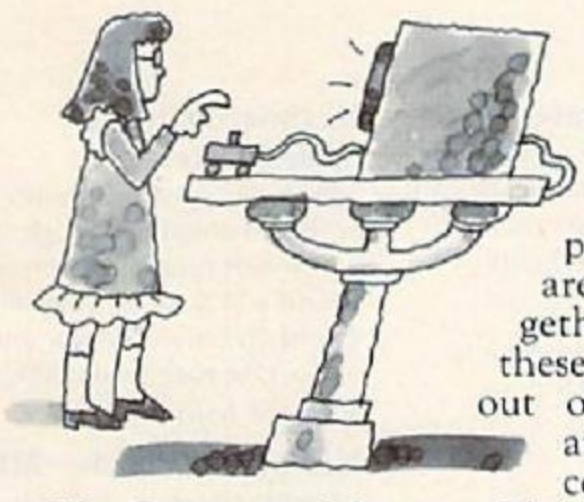
WANTED: OLD THINKER TOYS.

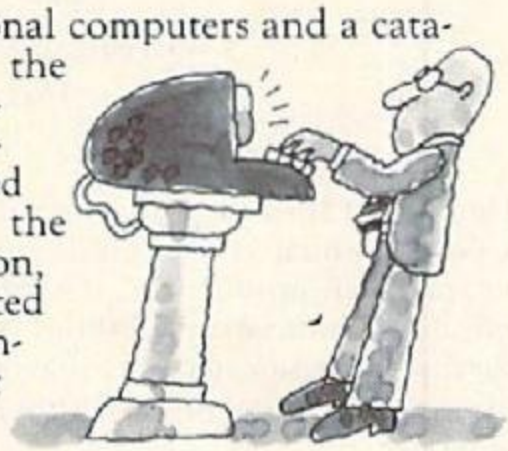


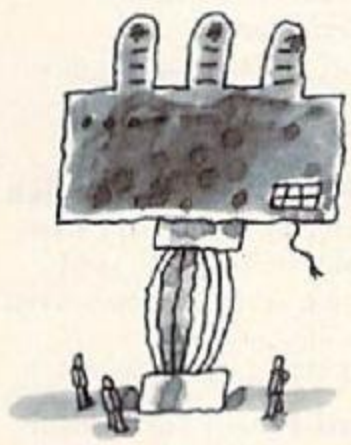
CW Communications, ComputerLand and The Computer Museum invite you to send in your early personal computers, software, and memorabilia — you could win a free trip to The Computer Museum in Boston

Your old, dusty "thinker toy" may now be ready to become a treasured museum piece. The Computer Museum in downtown Boston — an international museum dedicated entirely to computing — is searching for the very best and most unique relics of the personal computer revolution.



ComputerLand, CW Communications, and The Computer Museum are working together to bring these early relics out of your attic and into the collection of The Computer Museum. The museum is especially looking for kit machines, prototypes, programs, output, newsletters and memorabilia of early computing from around the world. A selection of the finest items will be used to create an exhibit on the evolution of personal computers and a catalog highlighting the Museum's collections. If your submission is accepted for addition to the Museum collection, you will be invited to the grand opening of the exhibit and will receive a bound edition of the catalog. If your item is selected as one of the five best "finds", you will also receive an all-expense-paid trip to Boston for the grand opening party.





So, get up to the attic, down to the cellar and into your closets, and tell us what you find! Call or write the Museum for an official entry form, or send a photo and description of your items by March 1, 1986 to: The Computer Museum, Personal Computer Competition, 300 Congress St., Museum Wharf, Boston, Massachusetts USA 02110, (617) 426-2800, Telex: 62792318.

ComputerLand®

The Computer Museum

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Entries will be judged on significance, rarity, date, completness and condition. Items particularly sought include pre-1980 machines, early serial numbers (get those number 1's out), machines made for purchase outside of North America (even modern machines are sought in this category); first releases of software such as first releases of operating systems, languages and mass-marketed and original applications; and pre-1980 photographs, newsletters, manuals and other records. The Computer Museum is a private non-profit educational institution. All donations are tax-deductible according to the provisions of the Internal Revenue Service. Thinker Toys is a registered trademark of George Murrow & Murrow Designs, Inc.

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SOFTWARE BUYER'S GUIDE

1985 · Part II

Here is the conclusion of the Software Buyer's Guide, which includes descriptions of over 200 programs. Part I appeared in the December 1985 issue.

This is Part II of the Software Buyer's Guide, which covers music and voice, personal productivity, telecommunications, tutorials and utilities. All programs in these categories may be used on the C-64 and on the C-128 in C-64 mode.

In each category, programs are listed alphabetically by program name, followed by a short description of the product, the current suggested retail price and the name of the manufacturer. To obtain more information on any product listed, consult the manufacturers' address list at the end of the guide and contact the manufacturer directly.

While *RUN* has tried to make this list as comprehensive and accurate as possible, the information was derived from a questionnaire sent to the manufacturers, and we are therefore not responsible for any omissions or errors of fact contained herein.

Music & Voice

MIDI/4 Plus and MIDI/8
Both the four- and eight-channel recording programs feature autocorrect, punch in/out, fast forward/rewind, sequence chaining and sync to tape, MIDI and drum machines. $99.95 (MIDI/4 Plus); $149.95 (MIDI/8)
Passport Music Software

Allegro
Allows you to create and modify music and incorporate it into your own programs; comes with a library of over 50 pre-programmed instruments. $39.95
Artworx Software Co., Inc.

Bank Street MusicWriter
Beginners, amateurs and professionals can compose, play and print out music with this program. $39.95
Mindscape, Inc.

Cantus, The Music Improviser
Invents its own music in three-voice improvisations. $54
Algo-Rhythm Software

Casio CZ Patch Librarian
Lets you see all the parameters available on the Casio synthesizer; parameters can be altered and auditioned. $65
Dr. T Music Software

Chord Power for Guitar
Displays and plays guitar chords. $39.95
NewArts Co.

Christmas Carols
Sing-along program of 18 holiday songs; verses appear as music plays in three-part harmony. $15.95
John Henry Software

Computer Hitware
A series of software packages that combine popular music with color graphics. $19.95 each
Passport Music Software

Dancing Feats
Allows you to perform simple pieces of music. $29.95
Softsync, Inc.

Easy Speech
Allows your text-driven software to "talk"; used in conjunction with Voice Messenger program. $24.95
Research in Speech Technology, Inc.

Keyboard Blues—MIDI
Presents simple blues chords; requires MIDI interface and synthesizer. $79.95
Electronic Courseware Systems, Inc.

Keyboard Chord/Scale Master
This is designed to enhance your keyboard abilities through sight and sound reinforcements of Chord and Scale Display modes, Chord and Scale Review modes and a Compare mode. $39.95
Valhala Software

Keyboard Chords—MIDI
Presents qualities of simple chords; requires MIDI interface and synthesizer. $79.95
Electronic Courseware Systems, Inc.

Keyboard Intervals—MIDI
Assists in the learning of major, minor, diminished and augmented intervals; requires MIDI interface and synthesizer. $79.95
Electronic Courseware Systems, Inc.

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Keyboard Jazz Harmonies—MIDI
Designed to teach chord symbols, seventh chord recognition and chord spelling; requires MIDI interface and synthesizer. $79.95
Electronic Courseware Systems, Inc.

Keyboard Kapers—MIDI
Consists of three piano keyboard games; requires MIDI interface and synthesizer. $39.95
Electronic Courseware Systems, Inc.

Keyboard Note Drill—MIDI
Designed to increase speed in identifying notes on bass and treble staves; requires MIDI interface and synthesizer. $39.95
Electronic Courseware Systems, Inc.

Listen
Helps you to identify intervals, basic chords and seventh chords. $29.95
Electronic Courseware Systems, Inc.

MacMusic
This music-composing program consists of a Macintosh-style user interface featuring menus and icons; includes ten hit songs. $49.95
Passport Music Software

Master Composer
A full-featured synthesizer and music composition program. $39.95
Access Software, Inc.

The Music Shop
Lets you write, edit, play and print out original compositions. $44.95
Broderbund Software

MusicWare
A series of software packages that allows you to play, compose and print out music, using a Sequential synthesizer keyboard. Up to $99 each
Sequential Circuits, Inc.

Party Songs
Sing-along favorite of 18 party songs; verses appear as music plays in three-part harmony. $15.95
John Henry Software

RhythmMaster
Helps you develop your musical rhythm skills. $39.95
Melodian, Inc.

Songwriter
"Word processor" for music; learn basics of music composition. $39.95
Scarborough Systems, Inc.

Super Challenger—MIDI
Audiovisual game designed to increase tonal memory of a series of pitches; requires MIDI interface and synthesizer. $39.95
Electronic Courseware Systems, Inc.

Virtuoso
Play or write music of up to 40 pages in length, with lyrics; staff and keyboard music representations. $20
TCO Software

Virtuoso +
Same as Virtuoso, but also prints music scores and lyrics. $29.95
TCO Software

Personal Productivity

IMSI Home Library Series
InfoManager (record management system), 4-Point Drawing Pad (graphics sketch program) and Electronic Address Book (maintains a file of your personal contacts). $39.95 each
Prentice-Hall

NB DB
This database program features print and screen-dump options, a search capability and variable line spacing. $25
NM & PP Enterprises

PFS: File
This database allows you to create your own file and store and retrieve information. $79.95
Software Publishing Corp.

PFS: Report
Sorts, calculates, formats and prints summary tables from files created with PFS: File. $69.95
Software Publishing Corp.

XPER
Guides you through complex decision-making criteria. $59.95
Abacus Software

XREF-64
Cross-references all variables, constants and line numbers and sorts them alphabetically. $17.95
Abacus Software

Brain Booster
Develops reasoning by visual analogy the skills that are tested on IQ tests and used to determine entrance to gifted programs. $29.95
Trillium Press, Inc.

Brown Bag
Contains a word processor and database program; features merging of text and data and a search-and-replace option. $49.95
Software Resource Group

Busidata
Allows you to create files with up to 20 fields per record and up to 70 characters per field. $49.95
Skyles Electric Works

Calc Now!
This spreadsheet has a capacity of up to 64 columns by 254 rows and 39K of free memory for data. $39.95
Cardco, Inc.

Calc Result Advanced
Thirty-two-page spreadsheet, with built-in help screens. $79.95
Handic Software

CalKit
A simplified spreadsheet package designed for home and small-business use. $49.95
Batteries Included

Chartpak-64
Prints out professional-quality charts and graphs; eight chart formats; two sizes of hard copy; accepts data from Multiplan, CalcResult; supports statistical functions. $39.95
Abacus Software

Compufile
Data management program. $29.95
(ABS)olute Software

The Consultant
Allows you to create records of up to nine screen pages with 877 characters each. $99.95
Batteries Included

Creative Problem Solving
Evaluates personal, financial and business problems by weighting your input; ranks information suggesting best solution; produces hard copy. $29.95
Harvsoft

Cut & Paste
Easy-to-learn word processor; includes document disk and reference card. $50
Electronic Arts

Daily Reminder
A year-round notebook and appointment calendar for home or office; features daily printouts. $39.95
International Computer Products

Data Base
Creates name and address files, formats for inventory control, mailing lists. $74.95
Handic Software

Data Manager 2
Provides you with an instant statistical analysis of your files. $49.95
Timeworks, Inc.

Datamat-64
Data management package uses menu selections; free-form design; 50 fields per record, 2000 records per disk; sort on multiple fields in any combination. $39.95
Abacus Software

Disk Management System
Catalogues your software and protects it from unauthorized users. $34.95
Cursor Products

Fab Business
Invoice packing list/label generator; uses plain paper or commercial forms. $39.95
Fabtronics

Fab-Mail
A mailing list program with emphasis on custom labels utilizing Star and similar printing abilities. $19.95
Fabtronics

The File Converter
Transfers text files or database files from one word processor or database program to another; program, user, sequential or relative files. $39.95
Applied Technologies, Inc.

Flex File
Allows you to create files with up to 20 fields per record and up to 70 characters per field. $59.95
Cardinal Software

Flexfile 2.1
Stores thousands of records with 20 or more information fields; sorts, calculates report totals, merges with popular word processors and prints and labels reports. $59.95
Cardinal Software

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Grade Organizer
Stores names and grades of up to 40 students in each of six classes; prints interim and final reports. $39.95
Cardinal Software

The Home Cataloger
A database that features automatic totaling of numeric fields, multiple searches and sorts and one-key command entry, includes ten predesigned record formats. $49.95
Arrays, Inc./ Continental Software

HomePak
Word processing, information management and telecommunications package; manual included. $49.95
Batteries Included

Homeword
A word processor that includes an audio cassette with a tutorial on how to use the program. $69.95
Sierra On-Line

Homework Helper
Helps adult or child organize school-related activities. $39.95
Navarone Industries, Inc.

Index Card Writer
Writes form letters on tractor-feed index cards; uses Mail Pac I program to address reverse side of card. $29.95
H&E Computronics, Inc.

Intelligent Software Package
Twenty-five home and small-business programs; includes word processor, database and spreadsheet. $29.95
Intelligent Software

Kid Pro Quo
Illustrated word processor for children; kids can write text, draw, paint, animate and compose music; for ages 8–14. $29.95
Softsync, Inc.

Mail Pac I
Prints names and addresses in either list form or on one-across mailing labels. $29.95
H&E Computronics, Inc.

MasterType's Filer
Helps you catalog valuables and maintain address list. $39.95
Scarborough Systems, Inc.

MasterType's Writer
This word processor uses color highlighting and dual windows. $39.95
Scarborough Systems, Inc.

Name Pro
Database for names, addresses, phone numbers, notes, etc.; prints personal little black book. $35
Computer Management Corp.

The New Consultant Update
Includes 80-column report space; on-screen help files; enhanced label functions; report systems allowing multiple files and ten predefined templates for mail lists, inventory, recipes and budgets. $79.95
Batteries Included

PaperClip
A professional word processor that allows you to make backup copies of the program. $89.95
Batteries Included

Peace of Mind
Includes four programs: Home Inventory, Credit Card Guardian, Private Messages and Vital Statistics. $19.95
Spectrum 1 Network

The Personal Check Register
Keeps track of all deposits and outstanding checks. $29.95
H&E Computronics, Inc.

Power Plan-64
This spreadsheet includes built-in graphics to display data in chart format; 90 help screens for guidance; includes 200-page handbook. $49.95
Abacus Software

Pro-Data
Create unique screen formats with few restrictions. $39.95
Nanosec Corp.

Quickwriter III
Word processor with advanced features. $19.95
Educomp

Ramstar Filing System
Designed for first-time users for the home and small business. $35
Ramstar Consultants

The Shopping Manager System
Prints out a shopping list customized to your local supermarket, from a 1300-item database of common grocery items. $31.45
Serendipity Software

Star*Script
Utilizes 80-column horizontal scrolling format. $14.95
Tri Micro

The Starter Kit
Ten programs for the home user; includes word processor, mailing list, music graphics games and programming tutorials. $19.95
Kastel Technology

SwiftSoft
Contains a spreadsheet and a series of home-organizer packages. $29.95
Cosmi, Inc.

Team-Mate
An integrated word processor, database, spreadsheet and hi-res graphics package. $49.95
Tri Micro

Telephone Directory
Stores and recalls telephone numbers, including address information; records can be printed out. $49.95
H&E Computronics, Inc.

Textomat-64
Word processor displays 40 or 80 columns, with horizontal scrolling, moves from editing to formatting to merging to utilities; supports any printer. $39.95
Abacus Software

Transogram Writer
Prints messages on outside of Transogram envelopes and prints carbon copy on inside. $29.95
H&E Computronics, Inc.

Trio
Integrated word processor, spreadsheet and database; includes Help windows. $49.95
Softsync, Inc.

Vizastar 64
An integrated software package that offers spreadsheet, database and graphics programs. $120
Solid State Software

The Whole Bit
Menu-driven word processor, with 80-column view, custom-tailored print commands, global search and replace, file merge and chain-print file copies; manual included. $39.95
Applied Technologies, Inc.

The Whole Bit
Same as previous program, except the manual is on disk and can be printed out, if desired. $24.95
Applied Technologies, Inc.

Word Writer
This word processor comes with two keyboard overlays. $49.95
Timeworks, Inc.

The Works!
This productivity package includes Graphics Painter, Typing Teacher, Music Composer, Letter Writer, Stock Portfolio and others. $49.95
First Star Software, Inc.

Write File
An integrated word processor and database. $29.95
Tri Micro

Your Home Office
An integrated word processor and electronic spreadsheet. $29.95
Tri Micro

Telecommunications

VIP Terminal XL
Replaces the VIP Terminal; transfers files to and from many information services. $39.95
Softlaw Corp.

Dow Jones News/Retrieval
Offers financial and investment news, shopping, airline scheduling and MCI Mail services. $75 registration fee
Dow Jones News/Retrieval

People/Link
Provides entertainment and socializing activities for its members. $30 sign-up fee
American People/Link

PlayNet
National telecommunications and entertainment network; features E-Mail, BBS, file transfer, games. $39.95
PlayNet, Inc.

QuantumLink
Telecommunications package gives subscribers access to news, education, entertainment, other QuantumLink users, shopping, customer service and information on Commodore computers. $9.95 per month
Quantum Computer Services, Inc.

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Rockney Work Station
Communications software providing on-line printing, file uploading/downloading and XModem. $49.95
Rockney Software

Sixth Sense
Gather and dispense information automatically and originate call to, as well as answer calls from, remote computers. $89.95
Microtechnic Solutions, Inc.

Telemessage
A bulletin-board system software package that you can tailor to meet your own needs. $79.50
Tailored Solutions

Viewtron
Receive up-to-the-minute news, weather forecasts, continuous sports scores, current stock prices and access to an up-to-date encyclopedia. The Viewtron Software Starter Kit is $9.95
Viewdata Corp. of America

Tutorials

ADA Training Course
Teaches the ADA language; includes editor, syntax checker, compiler, assembler, disassembler and handbook. $39.95
Abacus Software

Basic Lightning, Machine Lightning and White Lightning
This series is designed to aid in the development of professional-quality games. $40 each
Oasis Software

Beginning Basic On the C-64
Includes over 30 ready-to-run programs that feature games, personal finance, record keeping, music and educational software. $19.95
Alfred Publishing Co., Inc.

Clarinet Master
Comprehensive, self-paced tutorial with exercises and scales; includes lessons. $49.95
MasterSoft

CodePro-64
Provides advanced programming instructions, including tutorials in Basic, a sprite generator and demonstrator and a music generator and demonstrator. $59.95
Systems Management Associates

Compubridge
A bridge tutorial program that evaluates your actions, corrects mistakes or weak moves and suggests alternative strategies. $24.95
Artworx Software Co., Inc.

Computer Preparation For the SAT
Tutorial passages and practice material; includes four full-length practice exams. $79.97
Harcourt Brace Jovanovich, Inc.

Constellations I
An astronomy tutorial designed to teach you about the stars. $14.95
Morcon the Wizard Software

Dungeon Doom Typing Game
This arcade typing game provides drill in typing skills and includes a student management system. $39.95; $54.95 with backup disk
Gamco Industries, Inc.

Easy Guitar
Beginning and intermediate guitar lessons; uses sound and graphics as teaching aids. $29.95
DJ Software

Easy Tutor
Ten lesson plans for the beginner in Basic; includes assignments with explanations in subsequent lessons. $14.95
Tri Micro

Everything You Can Do With Your C-64
Includes word processing, education, graphics; no programming required; features product reviews. $19.95
Alfred Publishing Co., Inc.

Flute Master
Comprehensive, self-paced tutorial, with exercises and scales; includes lessons. $49.95
MasterSoft

International Morse Code Trainer
For beginners or those wishing to increase their code speed (1–25 wpm). $19.95
AC3L Software

Keyboard Cadet
Teaches touch-typing and keyboarding skills; 3-D graphics. $39.95
Mindscape, Inc.

Keyboard Chord/ Scale Master
Educational music package designed to enhance your keyboard abilities through sight-and-sound recognition of chords and scales. $39.95
Valhala Software

Keys to Typing
Thirty-two step-by-step typing lessons; manual included. $39.95
Batteries Included

Learning Guitar Overnight
Teaches basic chord recognition. $39.95
Chipware

Learn to Type
Aims to familiarize you with the typewriter and computer keyboards; for all ages. $39.95
Arrays, Inc./ Continental Software

Mastering the SAT
Combines skill-building and practice-testing; developed in cooperation with the National Association of Secondary School Principals. $79.95
CBS Software

MasterType's Writing Wizard
Designed for ages eight and up; features dual windows and multiple typefaces. $79.95
Scarborough Systems, Inc.

Morse Coach
A complete Morse code tutor in a plug-in cartridge. $49.95
Microlog Corp.

Musical Computer I and II
Introduces the basic fundamentals of music, including reading notes, understanding rhythm and reading signs and symbols. $34.95
Computer Applications Tomorrow

New Improved MasterType
This version adds new fingering chart and greater flexibility. $39.95
Scarborough Systems, Inc.

The Perfect Score
Includes tutorials and practice on the principal types of questions on the verbal section of the SAT, verbal and math SAT practice test and a practice Test of Standard Written English. $69.95
Mindscape, Inc.

Preparing for the SAT
Covers quantitative comparisons, antonyms and word analogies. $69.95
Program Design, Inc.

The Professor
Designed to familiarize you with all the basic functions of the C-64. $34.95
Progressive Peripherals & Software, Inc.

Smart Start
Provides access to the computing potential of your Commodore. $39.95
Muse Software

State Driver's Test Study Guide
Prepares you for the motor-vehicle operator's test; covers safety tips, meanings of signs and rules of the road. $44.95
Sunset Software

The Training Kit
An interactive, graphics simulation program that teaches you computer operation. $22.95
Kastel Technology

Trumpet Master
Comprehensive, self-paced tutorial, with exercises and scales; includes lessons. $49.95
MasterSoft

Type for Your Life
This typing teacher builds speed through practice and allows you to add your own text. $14.95
Apropos Technology

Typing
Employs an arcade-style reward game to motivate students to practice their typing lessons. $39.95
Gamco Industries, Inc.

Typing Tutor III
Touch-typing instruction program. $34.95
Simon & Schuster Electronic Publishing Group

The Visible Computer
Machine language teaching system; includes 150-page manual. $39.95
Software Masters

Welcome Aboard
This tutorial uses Muppets characters to teach novices (both children and adults) in the use of their computers. $24.95
Broderbund Software

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Utilities

19-Disk Set
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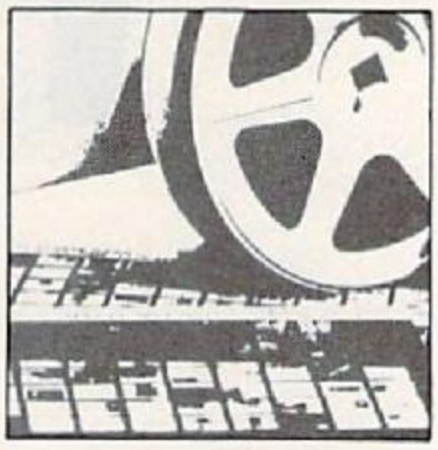

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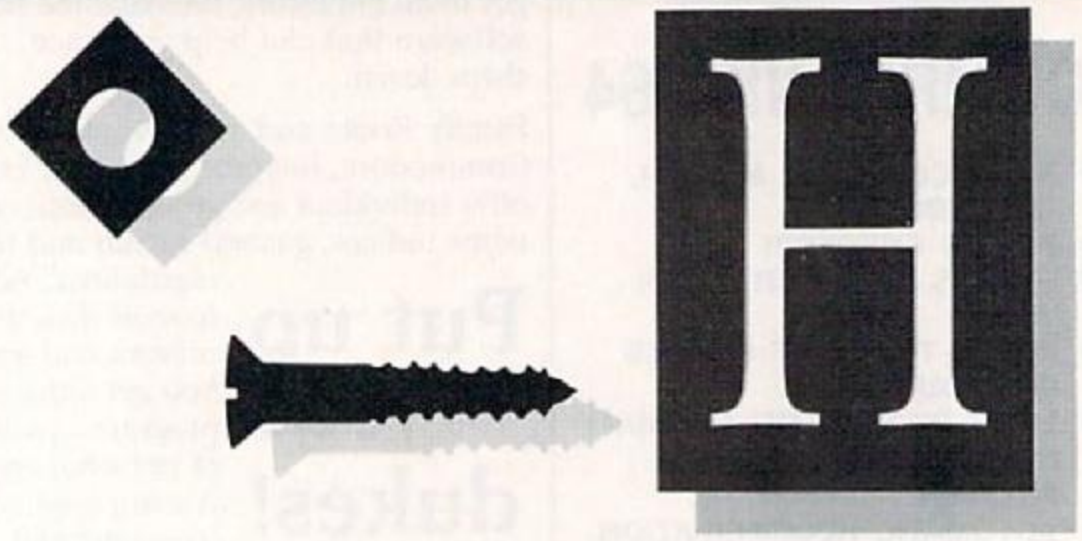

Compiled by SUSAN TANONA

Cartridge Expander

Here's a Three-Slot Expander for a More Versatile C-64

Navarone Industries is one of several companies producing cartridge expanders for the C-64. A cartridge expander lets you keep more than one cartridge plugged into your C-64 at the same time, relieving the wear and tear on your computer's cartridge port from plugging and unplugging cartridges.

Navarone's cartridge expander is one of the more versatile expanders on the market. Its hardware features give you complete control over your most-used cartridges.

It can accommodate up to three cartridges, which can be any combination of software, interface or other cartridge-port hardware. This cartridge expander also has a reset button for restarting your computer without actually having to turn off the computer's power.

A very important feature, which sets this expansion board apart from others, is a selector switch that allows you to designate which of the three slots you want activated. This ensures that you can keep three cartridges in place all the time. Even with the power on, you can change the active cartridge slot by simply flipping the selector switch and then pressing the reset button. The computer will reset and re-boot the appropriate program.

The cartridge slots are situated vertically on the unit. This makes a compact threesome and provides an easy angle from which you can insert and remove cartridges.

The board itself protrudes about six inches out of the back of your C-64; this takes up a lot of desk space. Also, if you are using a bulky cartridge (such as an MSD IEEE interface), you probably won't want to use this expander board. It would be too risky having an oversized cartridge that protrudes straight up. For most people, however, this is no problem, because most software cartridges are quite small.

The Navarone Cartridge Expander is a versatile and worthwhile product that will prolong the life of your computer, as well as save you valuable time. If you use cartridges often, this would be a wise investment. *(Navarone Industries, 510 Lawrence Expressway. #800, Sunnyvale, CA 94086. C-64/ $24.95.)*

Margaret Morabito
***RUN* staff**

HomeWriter 10

A Dot-Matrix, Commodore-Compatible Printer from Epson

It seems that for as long as there have been computers, there have been Epson printers. Entrenched in the offices of businesses everywhere, many have come to rely on Epson's quality, durability and reliability. For these and other reasons, Epson printers are often the standard by which all printers are judged.

Unfortunately, the HomeWriter 10 does not live up to the Epson standard. Although many of its features make it seem like a great printer, it also has its share of drawbacks.

With its off-white, streamlined styling, this is a good-looking printer. When you buy the HomeWriter 10, you must also buy the custom PIC (printer interface cartridge) in order to connect the printer to your Commodore. With the interface, you receive the 34-page manual necessary to operate the printer. The interface works very well in emulating a Commodore printer, including successful graphics screen-dump printing (an area of Commodore emulation that many printers have difficulty with).

The HomeWriter 10 offers seven modes of printing: draft, NLQ (near-letter quality), expanded, reversed, compressed, emphasized and double-strike. Like the Commodore computer, the printer can form either upper-/lowercase or uppercase/graphics characters. The HomeWriter 10 can recreate all of Commodore's keyboard graphics.

Other features include 60 × 72 dots-per-inch graphics, page-length settings of 11 or 12 inches and a paper-ending signal. The printer uses friction-feed; you can also purchase a tractor-feed unit ($39.95) or cut-sheet feeder ($99.95). In the bi-directional printing mode (only in Draft mode), the print speed is a slow 100 cps; the print speed is a crawling 16 cps in the NLQ mode.

With so many features and the Epson name behind it, you would expect that the HomeWriter 10 would be a high-quality printer. Unfortunately, that is not the case. This

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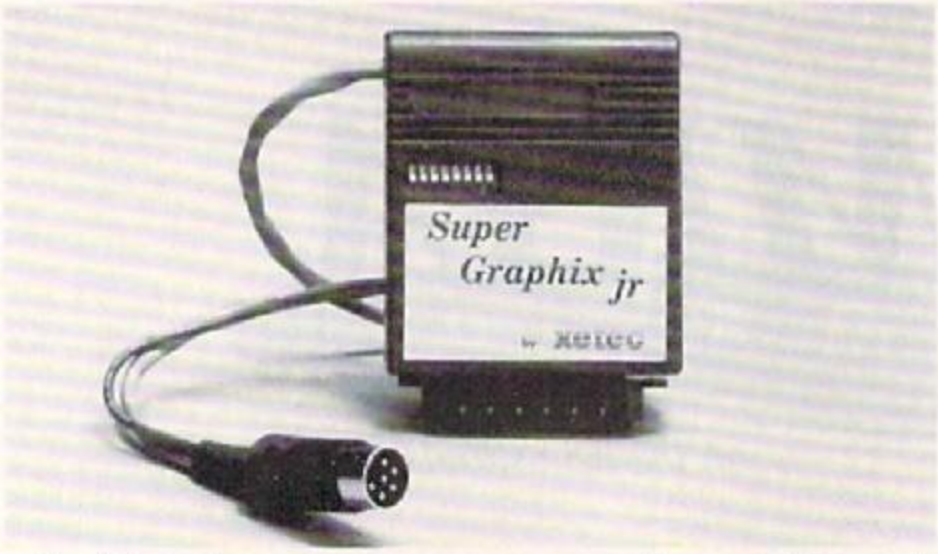

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Hardware Gallery

printer appears to be Epson's bid for the low-end, high-volume market. Aiming the printer at the home market, Epson seems to assume that home users don't need a sturdy, dependable printer.

The HomeWriter 10 is not very well built, especially considering its price. I found the print in the Draft mode to be of poor quality, and not much better in the NLQ mode. The friction-feed slips, and I think when it comes time to replace the ribbon cassettes, they are going to be difficult to find.

Although this printer offers many features and Commodore-1525 compatibility, its limitations make it somewhat overpriced. If you are looking for a speedy, solidly built printer, you may want to consider Epson's RX- or FX-model printers instead. *(Epson America, 2780 Lomita Blvd., Torrance, CA 90505. Printer, $269; printer interface cartridge, $60.)*

Guy Wright
***AmigaWorld* staff**

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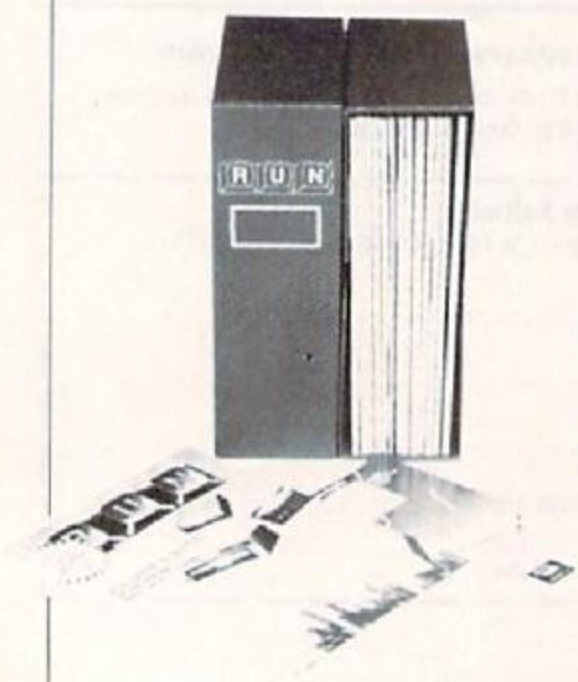

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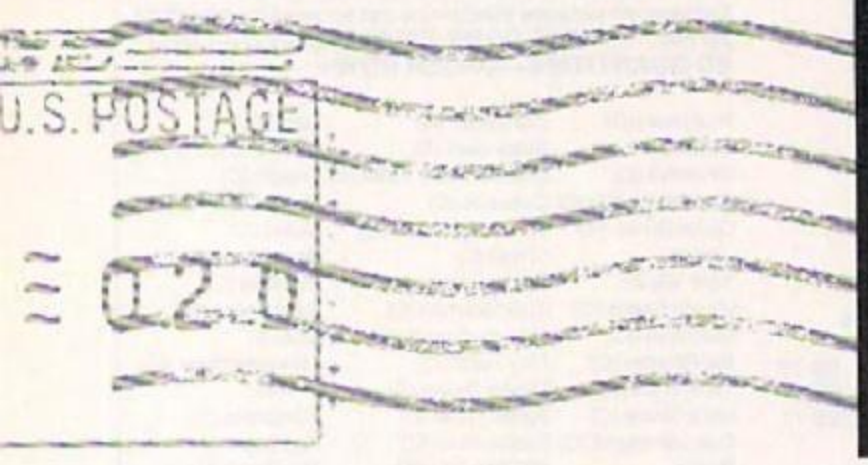

Checksum for Old Programs

I have enjoyed your publication *ab initio*. Your checksum programs are especially welcome. Long sessions of typing that result in malfunctioning programs due to incorrect entry can now be avoided. This encourages me (and probably many readers) to again type in the longer programs.

Please consider publishing checksums for your previously published programs. This would enable us to finally reap the rewards of the heretofore wasted hours and would be greatly appreciated.

Finally, I would like to commend you for the excellent Datafile database series.

R. Martin Reiley
Bedford, PA

I would like to suggest or have you explore the possibilities of providing the checksum values of previously published programs. These could be published in coming issues of *RUN* or in your yearly Special Issue. The alternative would be to release a supplement that could be purchased at a nominal cost to your readers.

Floyd L. Parks, Jr.
Buffalo, NY

I am 12 years old and think that the Turtle Graphics that accompany Richard Holleran's article, "A High-Performance Turtle" (*RUN*, July 1985) sound really neat. I tried to type them in, but kept making errors, so I finally gave up.

But now there is your checksum program, "64 Perfect Typist," and I have used it successfully for typing in Mark Jordan's Sprite Artist program ("High-Spirited Sprites," *RUN*, October 1985). I now never need to hesitate starting another great program from *RUN*.

I am hoping that you will consider publishing the checksum for "A High-Performance Turtle."

Also, keep up the good work on utilities and Basic extensions such as Basic 4.5 and turtle graphics—they're great.

Zoltan Hunt
Ontario, Canada

Beginning next month, RUN *will provide checksums for those programs that appeared in the magazine from January through August 1985. We hope this will enable our readers to enter and use those valuable programs.*

Editors

Beware of Disk ID Change

In regard to Magic trick $220 in your July 1985 issue: A word of caution should be issued about changing the cosmetic ID on track 18, sector 0. It appears that the potential problem of the DOS overwriting programs when swapping disks with identical IDs remains because of the following facts.

When the DOS formats a new disk, a block header and data header are written to each sector. The ID entered when formatting the disk is written to the header block of each sector and never *written* to again. During a "SEAK" ($F3B1 in ROM), the header-block ID, and *not* that of track 18/sector 0, is copied to $12 and $13 of drive RAM as the reference "Master ID" of the current disk after initialization. Thus, if the Master IDs are identical and those of 18/0 are different, the DOS sees two identical disks and *scrunch*—gnarled programs! Therefore, cosmetic ID changes are potentially dangerous.

Jack Boxer, M.D.
Vancouver, BC
Canada

Rescue Fund

As a follow-up to your article, "Commodore to the Rescue" (*RUN*, October 1985), I would like to inform your readers of David's Directory Designer, which allows you to redesign a disk's directory. This program, which I wrote, is being "sold" by the Catalina Commodore Computer Club for a tax-deductible donation of $15. All proceeds go to the Search and Rescue Fund, which has been set up to buy needed computing equipment. None of the money goes to me or any other individual.

If any of your readers are interested in obtaining DDD, they should contact the Catalina Commodore Computer Club at 201Z Avenida Guillermo, Tucson, AZ 85710.

David Lovelock
Tucson, AZ

A Call to Readers

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

Send your letters to Mail RUN, 80 Pine St., Peterborough, NH 03458.

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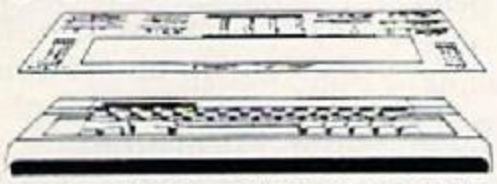

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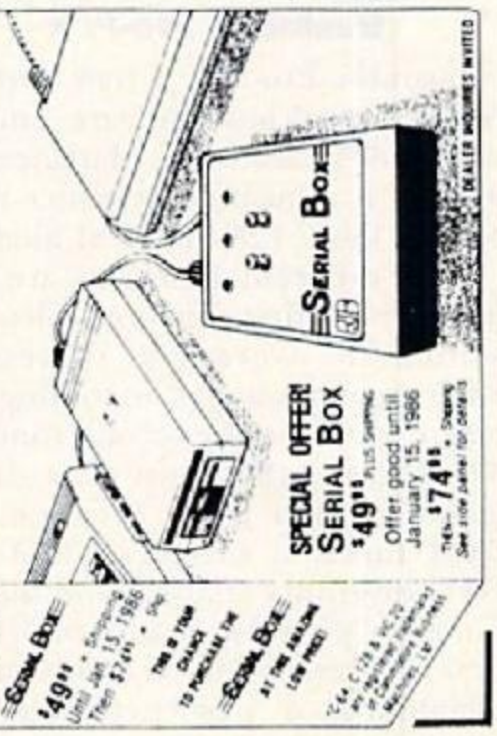

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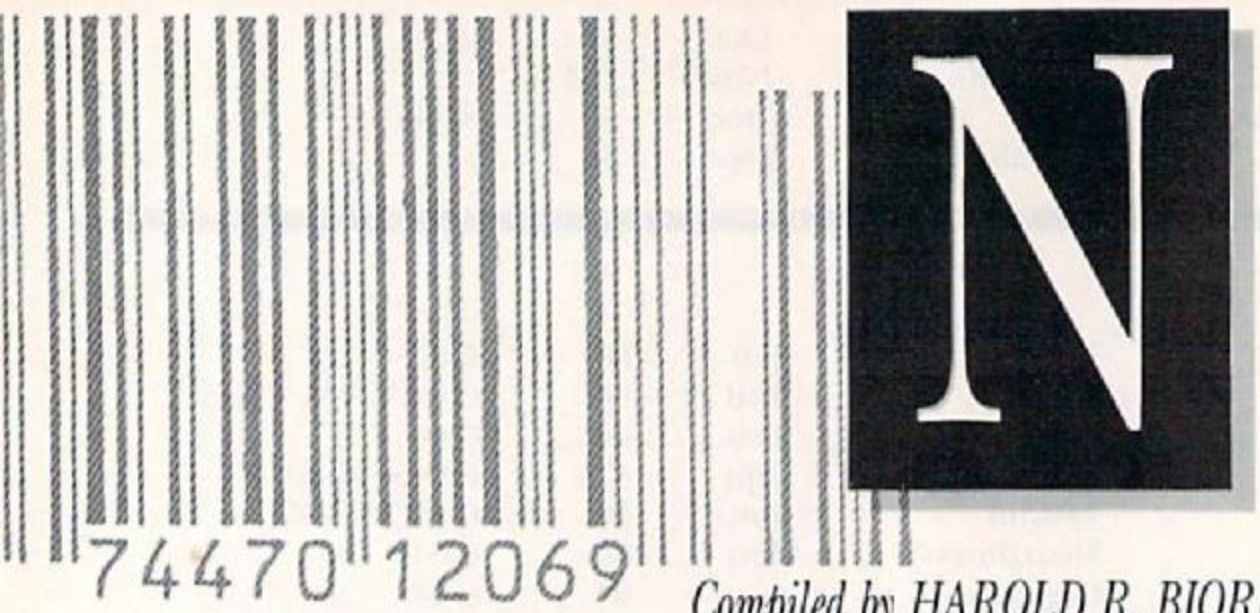

Compiled by HAROLD R. BJORNSEN

Four from Free Spirit

Free Spirit Software (5836 S. Mozart, Chicago, IL 60629) introduces four new software products on disk for the C-64.

Technique! is a guide to programming graphics, animation, sound and music and includes 12 songs and an arcade game for $29.95.

Basically Simple explains all commands and operators for the C-64 and teaches Basic programming. It's available for $20.

Postmaster is a $19.95 mailing list program that prints mailing labels, sorts addresses alphabetically and by zip code, stores phone numbers and recalls names and social security numbers.

Italy is a travel, adventure and educational game that includes instructions in Italian and familiar Italian melodies for background music. The package is available for $15.

Check Reader Service number 400.

Business Pro-Pak

Business Pro-Pak, a new product from SourceView Software International (835 Castro St., Martinez, CA 94553), is a business statistics package for the C-128 (in CP/M mode).

Four different functions are performed: the first function calculates arithmetic averaging, regression analysis, exponential smoothing and futures analysis; the second function determines the economic order quantity for a given situation; the third function includes LIFO and FIFO inventory analysis; and the last function provides many vital business utilities, including amortization scheduling, a perpetual calendar, present value of a future sum and pricing merchandise to achieve a desired profit margin.

Business Pro-Pak is available on disk for $99.

Check Reader Service number 404.

PaperClip for the C-128

Batteries Included (30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5) has released the PaperClip word processing program for the C-128. The new version has all the same features and capabilities of the C-64 version, plus new enhancements to take advantage of the C-128's hardware advances, such as: faster processing speed, easier operation and automatic startup, and its document size is expandable to 999 lines of text. Also, the screen will hold up to 160 columns of readable print without scrolling and will preview up to 250 columns without scrolling.

The C-128 PaperClip/C-64 PaperClip dual pack is available on disk for $89.95.

Check Reader Service number 402.

C-64 DMS

The Disk Management System includes three programs for the C-64 and 1541 disk drive.

The Utilities program allows you to list the directory on screen while executing disk commands; the Protection program features block-by-block data encryption, which ensures the secrecy of your confidential files; and the Cataloging program allows for easy creation and maintenance of your library database.

These three programs have been combined into one menu-driven system, which is available for $34.95 from Cursor Products, RR 71, Box 1858, Camdenton, MO 65020.

Check Reader Service number 401.

It's Coming!

CometWatch contains three programs to calculate orbits and the exact location of Halley's comet, for any date, time and location on earth, and also includes information on the physics of comets and how to observe and photograph them.

The package provides the history of Halley's comet and gives details of its 1985–1986 return. The program's main menu allows you to select activities and do orbit plotting and position calculations.

CometWatch is available on disk for the C-64 at $29.95. Zephyr Services, 306 S. Homewood Ave., Pittsburgh, PA 15208.

Check Reader Service number 403.

Fleet System 2

Fleet System 2 (Professional Software, 51 Fremont St., Needham, MA 02194) is a word processor that takes full advantage of the C-128's 80-column mode, expanded memory and RGB color monitor capabilities. A fully integrated 90,000-word spelling checker included in the package checks your document in 60 seconds. In addition, you may add over 15,000 words and terms to the program's dictionary to meet your needs. The Printer Preview option lets you see in 80 columns what your document will look like prior to printing. It also

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allows horizontal scrolling of up to 120 columns.

On the C-64, Fleet System 2 provides full horizontal scrolling for input of text in 40, 80 and 120 columns. Available on disk for $79.95.

Check Reader Service number 405.

Investment Package

The Personal Portfolio Manager, a comprehensive software package for managing investments in stocks and bonds, is available for C-64 owners who want to organize their portfolios.

PPM allows you to manage stocks, bonds, mutual funds and treasury bills; record taxable or non-taxable dividends or interest income; reconcile each brokerage account cash balance with YTD transactions; produce reports for your analysis; and enter quotes manually or automatically through DJN/R or Warner. It is available on disk for $39.95. Abacus Software, 2201 Kalamazoo SE, PO Box 7211, Grand Rapids, MI 49510.

Check Reader Service number 406.

C-128 Cable

Knight Software (Central Village, CT 06332) makes available to C-128 owners a cable that allows you to set a full 80-column monochrome display on most monochrome and composite monitors. It is priced at $14.95.

Check Reader Service number 408.

Double-O Funny

First Star Software (18 East 41st St., New York, NY 10017) has released Spy vs Spy II: The Island Caper. Based on the Spy vs Spy strip in *MAD* magazine, the two spies are in search of buried missile parts on an exotic tropical island. As spies, you and another player must dodge sharks, snares and coconut bombs while trying to avoid quicksand, cliffs and deadly lagoons. There are many booby traps, some of which you must construct yourself. Available on disk for the C-64 for $29.95.

Check Reader Service number 409.

Flip-Flop Interface

Microvations (5333 Mission Center Road, Suite 345, San Diego, CA 92108) has released a C-128 40/80-column flip-flop interface for the C-64. The interface allows you to switch between 40- and 80-column modes on your 1701, 1702 or color or monochrome composite monitor, and it eliminates the need for C-64 owners to update to the 1902 RGB monitor. It is available for $14.95.

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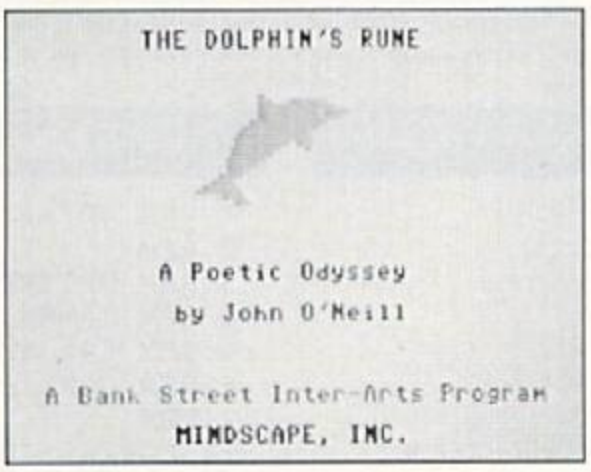

Day of the Dolphin

The Dolphin's Rune: A Poetic Odyssey, a game for the C-64, allows you to maneuver a dolphin through ocean perils to uncover encrypted messages containing the secret to solving the game's mystery.

As the dolphin, you must survive sharks and fishing nets and become adept at swimming through the game's color currents. As your skills improve, the ocean comes alive with dolphin sounds that can lead you to seabeds containing fragments of an epic poem composed in a runic alphabet.

Nine successful trips to the seabed yield nine encrypted stanzas of the poem that must be deciphered to reveal clues to the secret location somewhere on earth. When you've deciphered the ninth stanza, one of three additional stanzas is revealed. Only one of these extra stanzas provides more clues to the secret location. Available on disk for $29.95. Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062.

Check Reader Service number 411.

Learn to Tickle the Ivories

The Keyboard/Chord Scale Master (Valhala Software, 205 E. Hazelhurst, Ferndale, MI 48220) is a tutorial designed to enhance your keyboard-playing abilities through sight-and-sound reinforcements of chord and scale display modes, chord and scale review modes and a compare mode. Each mode allows you to choose up to 12 key signatures for reviewing.

The Chord Display and Scale Display modes allow you to view and sound the most commonly used chords and scales.

The Chord Review and Scale Review modes utilize drills, quizzes and a competitive game of challenge to help you in your study.

The Compare mode allows you to compare two chords in the same or different key signatures.

The package is available on disk for the C-64 for $39.95.

Check Reader Service number 407.

More Print Shop Graphics

Broderbund Software (17 Paul Drive, San Rafael, CA 94903) introduces The Print Shop Graphics Library, Disk 3, the third follow-up graphics program to its original Print Shop.

The Graphics Library provides 120 additional designs, symbols and pictures for do-it-yourself graphics creations that include six categories: Christmas, business, international symbols, myth and fantasy, seasons and animals.

The program also includes a variety of typefaces, borders and graphics images and also lets you modify existing graphics or design your own original images. Available on disk for the C-64 for $24.95.

Check Reader Service number 410.

Scenery Disks

SubLogic (713 Edgebrook Drive, Champaign, IL 61820) has released six different scenery disks to be used with the manufacturer's flight simulation products—Flight Simulator II and Jet.

Each disk covers a geographical region of the western U.S. and includes the major airports, radio-navigation aids, cities, highways, rivers and lakes located in that region. There is enough detail on each disk for either visual or instrument cross-country navigation.

Individual scenery disk packages are available for the C-64 for $19.95. The Western U.S. six-disk set may be purchased for $99.95.

Check Reader Service number 413.

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How to Type in C-64 and C-128 Listings from RUN

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using RUN's Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17Ø13
7 REM
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
4Ø IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
6Ø POKEML+4,PG:POKE ML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,P
   G
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   ************************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
1ØØ PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+3Ø"=OFF **"
1Ø1 PRINT"{CRSR RT}**************************
    **************":NEW
11Ø DATA 173,ØØ5,ØØ3,2Ø1,ØØ3,2Ø8,ØØ1,Ø96
12Ø DATA 141,1Ø5,ØØ3,173,ØØ4,ØØ3,141,1Ø4
13Ø DATA ØØ3,162,1Ø3,16Ø,ØØ3,142,ØØ4,ØØ3
14Ø DATA 14Ø,ØØ5,ØØ3,Ø96,234,234,173,1Ø4
15Ø DATA ØØ3,141,ØØ4,ØØ3,173,1Ø5,ØØ3,141
16Ø DATA ØØ5,ØØ3,Ø96,Ø32,124,165,132,Ø11
17Ø DATA 162,ØØØ,142,24Ø,ØØ3,142,241,ØØ3
18Ø DATA 189,ØØØ,ØØ2,24Ø,Ø51,2Ø1,Ø32,2Ø8
19Ø DATA ØØ4,164,212,24Ø,Ø4Ø,2Ø1,Ø34,2Ø8
2ØØ DATA ØØ8,Ø72,165,212,Ø73,ØØ1,133,212
21Ø DATA 1Ø4,Ø72,238,241,ØØ3,173,241,ØØ3
22Ø DATA Ø41,ØØ7,168,1Ø4,Ø24,Ø72,Ø24,1Ø4
23Ø DATA Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1Ø9
24Ø DATA 24Ø,ØØ3,141,24Ø,ØØ3,232,2Ø8,2ØØ
25Ø DATA 173,24Ø,ØØ3,Ø24,1Ø1,Ø2Ø,Ø24,1Ø1
26Ø DATA Ø21,141,24Ø,ØØ3,169,Ø42,Ø32,21Ø
27Ø DATA 255,169,ØØØ,174,24Ø,ØØ3,Ø32,2Ø5
28Ø DATA 189,162,ØØ3,189,211,ØØ3,Ø32,21Ø
29Ø DATA 255,2Ø2,Ø16,247,164,Ø11,Ø96,145
3ØØ DATA Ø13,Ø32,Ø32
```

Listing 2. *128 Perfect Typist program.*

```
1 REM 4Ø/8Ø COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17Ø13
7 REM
1Ø FORX=512ØTO5379:READD:T=T+D:POKEX,D:NEXT
2Ø IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
   N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{2Ø SPACEs)
   "
3Ø PRINT"{SHFT CLR}"A$"{CRSR RT}***********
   ****************************"
4Ø PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
   S NOW ACTIVE **"
5Ø PRINTA$"{CRSR RT}**{2 SPACEs}SYS 512Ø=ON
   {7 SPACEs}SYS 515Ø=OFF{2 SPACEs}**"
6Ø PRINTA$"{CRSR RT}**********************
   ***************":SYS512Ø:NEW
512Ø DATA 173,ØØ5,ØØ3,2Ø1,Ø2Ø,2Ø8,ØØ1,Ø96,1
      41,Ø45
513Ø DATA Ø2Ø,173,ØØ4,ØØ3,141,Ø44,Ø2Ø,162,Ø
      43,16Ø
514Ø DATA Ø2Ø,142,ØØ4,ØØ3,14Ø,ØØ5,ØØ3,Ø96,2
      34,234
515Ø DATA 173,Ø44,Ø2Ø,141,ØØ4,ØØ3,173,Ø45,Ø
      2Ø,141
516Ø DATA ØØ5,ØØ3,Ø96,Ø32,Ø13,Ø67,14Ø,255,Ø
      19,162
517Ø DATA ØØØ,142,252,Ø19,142,253,Ø19,142,2
      54,Ø19
518Ø DATA 189,ØØØ,ØØ2,2Ø1,Ø32,24Ø,ØØ8,2Ø1,Ø
      48,144
519Ø DATA ØØ7,2Ø1,Ø58,176,ØØ3,232,2Ø8,238,1
      89,ØØØ
52ØØ DATA ØØ2,24Ø,Ø54,2Ø1,Ø32,2Ø8,ØØ5,172,2
      54,Ø19
521Ø DATA 24Ø,Ø42,2Ø1,Ø34,2Ø8,Ø1Ø,Ø72,173,2
      54,Ø19
522Ø DATA Ø73,ØØ1,141,254,Ø19,1Ø4,Ø72,238,2
      53,Ø19
523Ø DATA 173,253,Ø19,Ø41,ØØ7,168,1Ø4,Ø24,Ø
      72,Ø24
524Ø DATA 1Ø4,Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1
      Ø9,252
525Ø DATA Ø19,141,252,Ø19,232,2Ø8,197,173,2
      52,Ø19
526Ø DATA Ø24,1Ø1,Ø22,Ø24,1Ø1,Ø23,141,252,Ø
      19,169
527Ø DATA Ø42,Ø32,241,Ø2Ø,Ø32,188,Ø2Ø,16Ø,Ø
      Ø2,185
```


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```
5280 DATA 185,020,032,241,020,136,016,247,1
     65,116
5290 DATA 208,009,165,117,208,005,169,145,0
     32,241
5300 DATA 020,172,255,019,096,013,032,032,1
     62,000
5310 DATA 173,252,019,232,056,233,100,176,2
     50,105
5320 DATA 100,202,240,003,032,232,020,201,0
     10,176
5330 DATA 005,205,252,019,240,015,162,000,2
     32,056
5340 DATA 233,010,016,250,024,105,010,202,0
     32,232
5350 DATA 020,170,072,138,009,048,032,241,0
     20,104
5360 DATA 096,170,173,000,255,072,169,000,1
     41,000
5370 DATA 255,138,032,210,255,104,141,000,2
     55,096
```

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RUN AMOK

Item: Three bugs have turned up in Robert Rockefeller's Basic 4.5 (June, July and August 1985). First, used alone, the Restore key crashed the program and also prevented RS-232 from working. Second, trying to list the program from one specified line to another resulted in the listing passing right by the ending line, so you had to list the entire balance of the program. Finally, the Vibrato command didn't work.

The following four Pokes should fix the bugs. It is first necessary to load and start Basic 4.5. After the Pokes have been executed, the corrected Basic 4.5 can be saved with BSAVE "BASIC 4.5", P$8000 to P$A000.

```
POKE $862D,4
POKE $82B0,$1B
POKE $8171,$47
POKE $8172,$FE
```

The RUNning Board

RUN invites you to contact its bulletin board (RUNning Board). In addition to up-to-date information about *RUN* and the Commodore industry, the RUNning Board now presents useful computing hints and tips, corrections and updates to published articles, user's group information, an up-to-date list of selections for ReRUN and sneak previews of upcoming articles.

The RUNning Board also features a menu format that makes it easier and faster for you to select a specific section of the bulletin board. We use a standard protocol, 300 baud, one stop-bit, no parity, full duplex and a word length of eight bits.

The RUNning Board is definitely worth a call. You can get on-line anytime, 24 hours a day, seven days a week, by dialing 603-924-7632.

February

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- **C-128 Custom Character Sets**—Why limit yourself to the C-128's standard characters when you can create your own? From a foreign-language symbol to a lightning bolt—this article shows you how.
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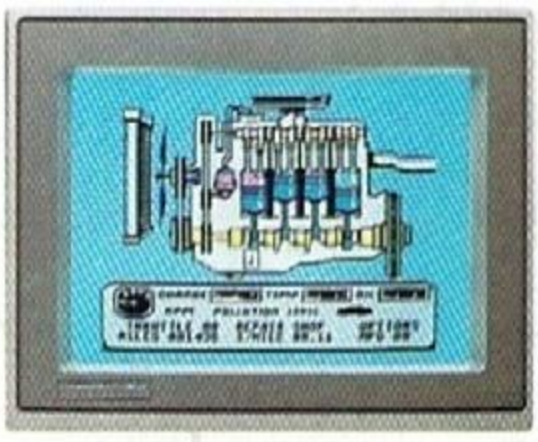

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